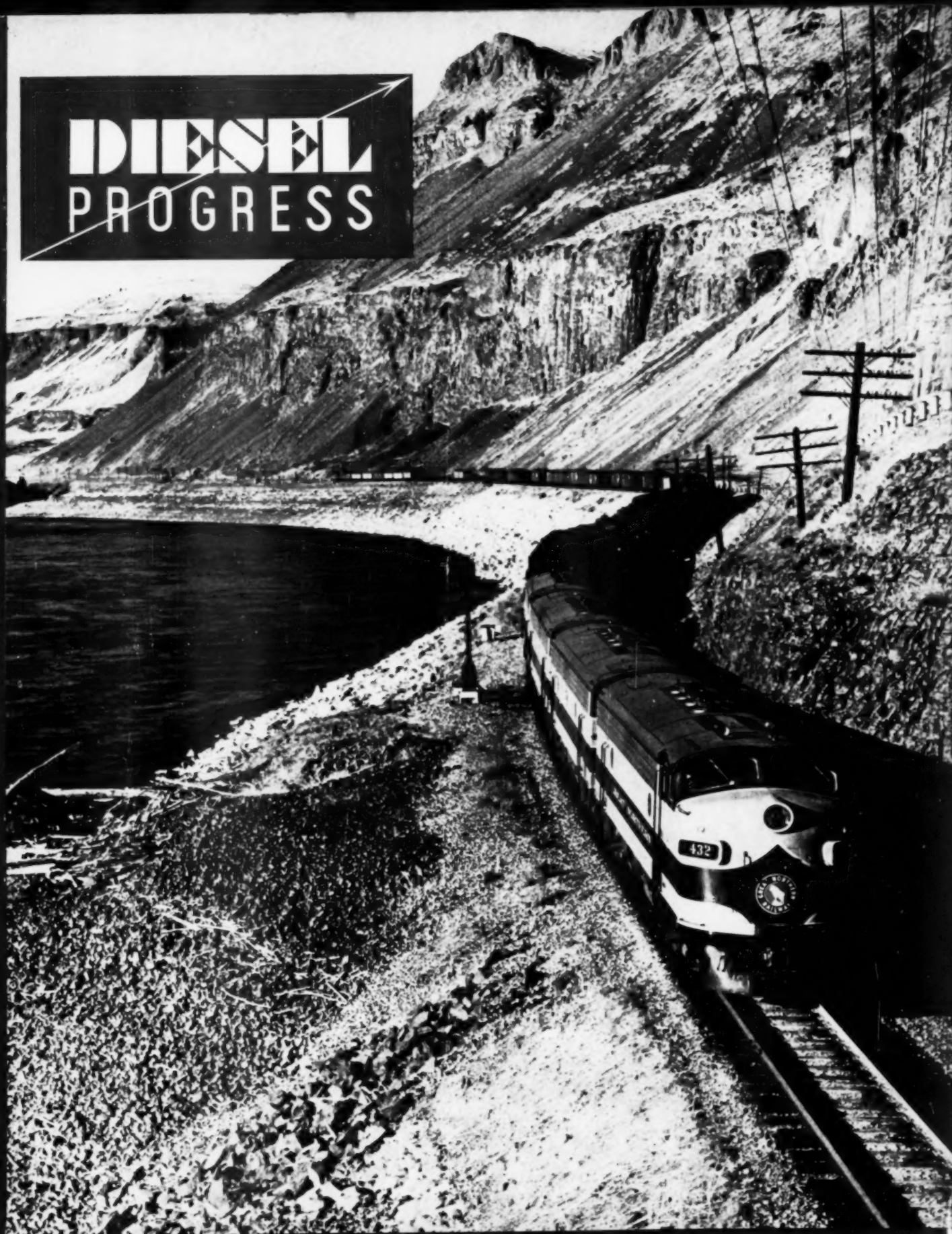


IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR • UNDERGROUND

# DIESEL PROGRESS



FIVE DOLLARS PER YEAR

FEBRUARY, 1949

FIFTY CENTS PER COPY



## ASSURE **BETTER COMBUSTION** AND **LOWER FUEL COSTS**

**With Texaco Ursa Oils  
...that keep Diesels  
clean...rings free**

**B**ECAUSE *Texaco Ursa Oils* are specially refined to resist oxidation, heat and pressure, they keep Diesels exceptionally clean. That's why, at overhaul time, rings are found free...ports clear, valves clean...liner wear at a minimum...bearings fully protected. That's why *Ursa*-lubricated Diesels are high

on efficiency, low on fuel consumption and maintenance costs.

That's why, too, *Texaco Ursa Oils* are approved by all leading Diesel builders, and why—

*More stationary Diesel hp. in the U. S. is lubricated with Texaco Ursa Oils than with any other brand.*

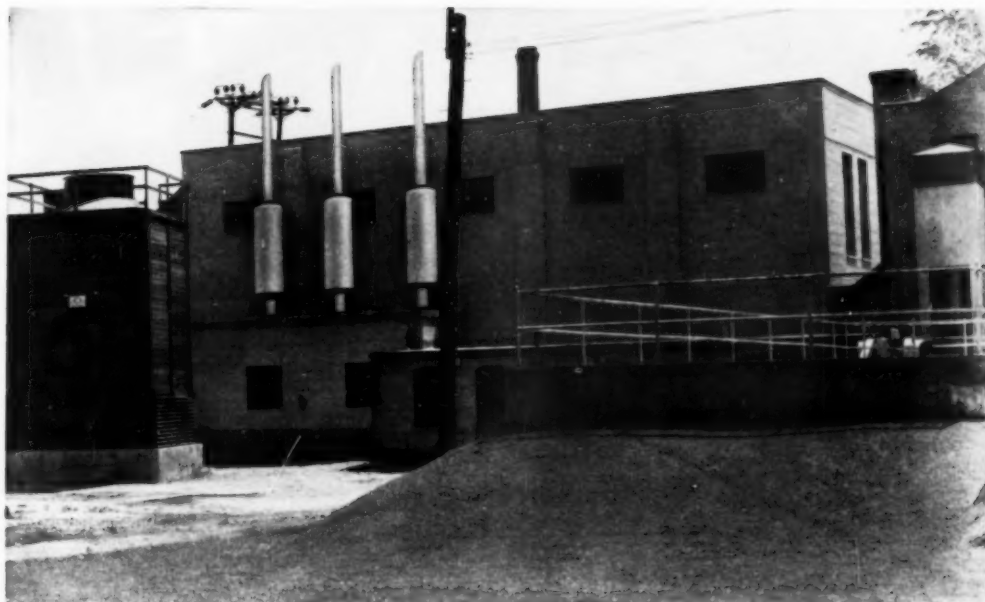
Call in a Texaco Lubrication Engineer. Let him help you get greater operating efficiency at lower cost. Telephone the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 E. 42nd St., New York 17, N.Y.



## **TEXACO Ursa Oils**

**FOR ALL DIESEL ENGINES**

Tune in...TEXACO STAR THEATRE presents MILTON BERLE every Wednesday night. METROPOLITAN OPERA broadcasts every Saturday afternoon.



Columbus, Wisconsin, power plant uses Burgess-Manning Snubbers on its three Worthington 7-cylinder, 4-cycle Diesels.

## Snub the Slug—and Stop the Noise FROM DIESEL EXHAUSTS!

Diesel and other internal combustion engines can be operated anywhere . . . without exhaust noise . . . when you equip them with Burgess-Manning Exhaust Snubbers. Widely used for such critical locations as office buildings, hospitals, community installations, ships, oil fields, and industrial applications where no exhaust noise disturbances can be tolerated or where danger of explosions or flying sparks must be eliminated.

Burgess-Manning Snubbers prevent noise by dissipating the "slugs" of gas from Diesel engines . . . with no interference to high engine performance. Special "Fog-jet" Snubbers snub the "slugs" to prevent exhaust noise, scrub out glowing sparks, spray a mist of cooling water vapor on the exhaust gases entering the Snubber . . . to cool and extinguish flame from the engine.

Burgess-Manning Snubbers are designed for Diesel, gas, dual fuel, and gasoline engines used in stationary, marine, locomotive, and portable service. A wide variety of types and sizes of Snubbers is available.

If you are considering the installation of Diesel or other type internal combustion engines, or if you have exhaust noise complaints, let Burgess-Manning submit Snubber recommendations. Long experience guarantees complete satisfaction. Write for literature.

**BURGESS-MANNING COMPANY**

LIBERTYVILLE, ILLINOIS



Connecticut pumping station uses Snubbers to prevent noise from Diesel exhaust. No tuning of exhaust pipe length is necessary with these Snubbers. They prevent noise, regardless of position or location in the exhaust system.

The trawler "Wm. J. O'Brien" is a typical fishing boat equipped with Burgess-Manning SDM Spark Arrester Exhaust Snubbers. They remove sparks from exhaust and prevent noise. Compact construction . . . ideal where space is limited.

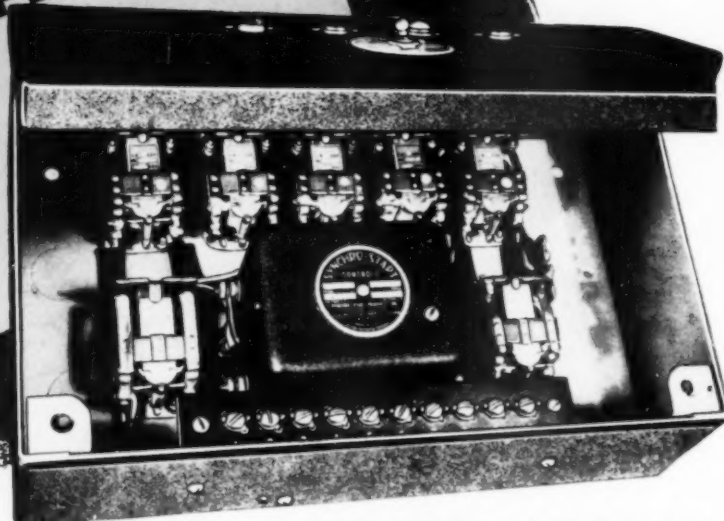


Municipal light plant at Oberlin, Ohio, depends upon Burgess-Manning Snubbers to suppress exhaust noise that would otherwise be very objectionable to the community.

# Complete CONTROL IN EVERY STEP OF ENGINE OPERATION

for  
DIESEL  
GASOLINE  
OR GAS

Model 1436



## with SYNCHRO-START *Automatic* ENGINE CONTROLS

### STARTING

When power is demanded SYNCHRO-START will automatically start the engine from any type of remote pilot switch, such as power failure switch, temperature switch, float switch, pressure switch, line voltage drop, etc.

### PROTECTING

While the engine is running, it is fully protected against any abnormal condition, such as low oil pressure, overheating, failure of fuel or ignition, overspeeding, etc. . . Any such failure will shut the engine down before damage can result. The interrupted and overall cranking limit features protect the starting motor and battery.

### STOPPING

When power is no longer needed, SYNCHRO-START will automatically stop the engine—shut off battery current, ignition, fuel—water—air—or whatever is necessary for a perfect stop and reset the controls for the next power demand.

### SIGNALING

In case of any failure of the engine while running or failure to start, the SYNCHRO-START controls will stop the engine and any desired ALARM or SIGNAL may be used to summon an operator and a signal light in the front of the cabinet will show the exact cause of the trouble.

## SYNCHRO-START GIVES *Continuous* AND *Full Automatic* OPERATION

SYNCHRO-START Controls have been providing safe, dependable AUTOMATIC power for America's largest dams, bridges, irrigation projects, commercial and institutional jobs of refrigeration, air conditioning and power generation, mine and oil field pumping, theatres, hospitals, marine installations, radio stations, fire protection, Army, Navy and Air service installations, pipe line booster stations and scores of other main, auxiliary or emergency uses.

Other SYNCHRO-START products include Solenoids, Overspeed Governors, Automatic Cranking Controls, Safety Stop and Alarm Sets, Multiple Engine Load Control Panels, Fire Pump Panels, Oil and Water Switches, Power Failure Relays, Remote Control Stations, Magnetic Contactors, and all types of relays for special applications. Your engine dealer can furnish you with SYNCHRO-START Controls, or, write direct to us for details.

# SYNCHRO-START PRODUCTS, INC.

1046 W. FULLERTON AVE.



CHICAGO 14, ILLINOIS

# DIESELS ON THE JOB-



Diesel crawler  
pulling a fire-line plow

## DELCO-REMY EQUIPMENT ON THE DIESELS

Wherever Diesels are at work, you'll usually find Delco-Remy electrical equipment.

Delco-Remy electrical units are dependable, durable, designed for the job. Delco-Remy has worked closely with Diesel manufacturers to make them that way.

Operators of Diesel applications have come to respect the Delco-Remy name. It's good assurance of good electrical performance.



**DELCO-REMY—A UNITED MOTORS LINE**  
Service Parts and Delco Batteries  
Available Everywhere, Through  
**UNITED MOTORS DISTRIBUTORS**

## Delco-Remy

DIVISION, GENERAL MOTORS CORPORATION  
ANDERSON, INDIANA

**DELCO-REMY • WHEREVER WHEELS TURN OR PROPELLERS SPIN**



This ad is the first of a series featuring well known automotive Diesel engines.

(Above left) Series 161 Buda Diesel engine rated 148 hp (continuous load) at 1400 rpm. (Right) cutaway view through cylinder showing lubrication of piston and bearing.

**GULFPRIDE DIESEL** the world's finest Diesel Oil — Alchlor-processed

**GULFLUBE MOTOR OIL H.D.** high quality — Multi-Sol-processed

**Gulfpride-Diesel**, the world's finest Diesel Oil, is superrefined by Gulf's exclusive Alchlor Process, an extra refining step that discards as much as 15% of a conventionally refined oil. This 15% contains the hydrocarbons most apt to oxidize during engine operation to form sludge, varnish, and other objectionable engine deposits.

Gulfpride-Diesel is compounded with the proper amount of detergent-dispersant additive—holds soot particles in suspension. Gulfpride-Diesel keeps engines cleaner and smoother running, is setting new performance records in the maintenance of all types of automotive Diesel engines.

**Gulflube Motor Oil H.D.** is an outstanding heavy duty type oil at a competitive price. Refined from paraffin base crudes by Gulf's special Multi-Sol Process.

For further information on these two fine oils and for expert help on other phases of Diesel engine lubrication, call in a Gulf Lubrication Engineer today.

**Gulf Oil Corporation • Gulf Refining Company**

Division Sales Offices:

Boston • New York • Philadelphia • Pittsburgh • Atlanta  
New Orleans • Houston • Louisville • Toledo



- ★ — To Keep Reciprocating Pumps in Service Longer
- ★ — To Guard Against Valve Failure
- ★ — To Permit Long Term Maintenance Economy

# DURABLA

## METAL PUMP VALVE UNITS\*

### 1. Will Fit Any Reciprocating Pump, New Or Old

Adaptable as standard equipment or as replacement units, operating in any position or under rigorous space, weight, speed or load conditions. Available in eleven standard sizes machined to your order or supplied for your stock to be fitted as required.

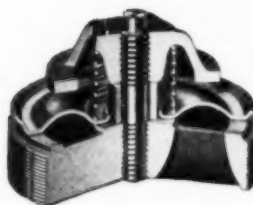


### 2. Will Stand Up Under Any Pressure, Temperature, or Chemical or Abrasive Hazard

The Durabla arched construction metal valves are in service at pressures as high as 5000 pounds per square inch. Protective alloys permit operation at temperatures ranging from 800°F to extreme sub-zero conditions and give protection against corrosive fluids or gases, and suspended abrasive substances.

### 3. Will Contribute to Pump Efficiency

The light weight valve permits light spring loading, less power to open valves, no lag in valve opening and closing; slower speed operation at full capacity. The valve guard permits controlled lift, insuring minimum of slip, cavitation, or turbulence. The central valve stem insures no impedance to flow around the entire valve member. Freely mounted valve member can tip to adjust to natural flow lines.



### 4. Will Last Longer

The freely mounted valve member permits self grinding action and accommodation to wear on the valve seat. Valve spring is self cleaning and protected against wear due to touching of the coils. There are no wing guides or high hubs to cause friction, binding or stem breakage due to side pressure, no rubber to deteriorate or pick up suspended matter; a minimum stock is needed to fit all requirements; installation is simple and requires minimum shut-down time.

A pump valve seldom attracts attention until there is something wrong with it and when it causes trouble it causes serious trouble, expense or delay. The unique characteristics of DURABLA VALVES, summarized above, and illustrated in diverse applications in our DURABLA CATALOG 920, will give you effective and versatile insurance against pump failure.

Address DURABLA Engineering Department  
for Information and Bulletin: Reference 9P2

\*Patent Numbers 2090486, 2117504

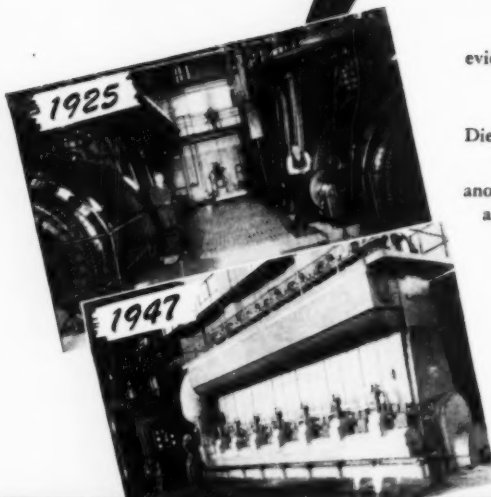
## DURABLA MANUFACTURING COMPANY

114 LIBERTY ST. NEW YORK

BRANCHES IN PRINCIPAL CITIES. FOR CANADA REFER: CANADIAN DURABLA LIMITED, TORONTO

# 4<sup>th</sup> NORDBERG DIESEL

for Marquette, Michigan



Experience of the City of Marquette, Michigan, is evidence of the versatility of Nordberg Diesel Engines in meeting fast-changing power requirements.


In 1925, during a serious power shortage, two Nordberg Diesels were installed in order to restore service quickly.

In 1947, needing an additional engine quickly to meet another power shortage, Marquette installed their third Nordberg—a 3000 H.P. unit. Since then, to help meet the power shortage which has continued to exist, their fourth Nordberg Diesel was shipped, and is now being installed.

*For regular or emergency service, you can't beat the advantages of Nordberg Diesels . . . they can be added to the line quickly, and can be held ready for instant service without exorbitant standby expense.*

**NORDBERG MFG. CO.**  
MILWAUKEE 7, WIS.


P249



A DIVISION OF NORDBERG

## NORDBERG

### DIESEL ENGINES



NORDBERG  
MILWAUKEE

# Dirt-Proof

Your Fuel Oil and Lube Oil with  
**AC Filter Elements**



**FOR FUEL FILTERS**

Millions of hours of service stand behind the AC Quality Elements engineered for Diesel fuel filters. For their full life, these precision-built elements actually "Dirt-Proof" the fuel. As protection for fuel injectors and transfer pumps, AC Elements are unequalled. Yet their cost is little, if any, greater.



**FOR LUBE OIL FILTERS**

AC also builds a full line of elements for nearly every make of lubricating oil filter—elements so efficient that they "Dirt-Proof" lube oil. Each element is precisely engineered for the job it is to do, and the filter it is to fit. Each gives the longest protection consistent with maximum filtering efficiency.

## Complete Filters and Strainers for both Fuel and Lube Oil

For the fuel system, AC Strainers and Filters are made to serve engines up to 500 hp.—intermittent or continuous operation.

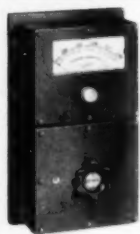
For the lubrication system, AC Oil Filters are available for engines up to 1800 cubic inch displacement.

AC SPARK PLUG DIVISION •



## OIL FILTERS

GENERAL MOTORS CORPORATION



#### Send for Catalog!

For complete information on the line of Alnor exhaust pyrometers available to you, send for bulletin 4361 which contains the whole story.

Illinois Testing Laboratories, Inc.  
Room 507, 420 N. LaSalle Street, Chicago 10, Ill.

- ☐ Send Bulletin 4361  
☐ Have Alnor Representative call.

Name .....

Firm name .....

Address .....

City.....Zone.....State.....

Why does practically every major diesel engine manufacturer provide Alnor exhaust pyrometers as original equipment? Because Alnor exhaust pyrometers provide the user with the simplest, lowest cost means of anticipating trouble and breakdowns before they start, of reducing maintenance expenses to a bare minimum, of assuring maximum efficiency and long-lived operation. Exhaust temperature readings give any diesel operator the complete story of engine operation, cylinder by cylinder. Careful readings when new engines are being installed and adjusted mean getting off to the right start: consistent twice-a-day readings throughout the life of the engine can prevent costly wear and expensive failures—to more than pay for the installation of Alnor exhaust pyrometers. If your diesel engines are not equipped with these instruments, chances are that they should be.

Illinois Testing Laboratories, Inc.  
420 N. LaSalle Street, Chicago 10, Illinois

# Alnor

PRECISION INSTRUMENTS  
FOR EVERY INDUSTRY



**LANOVA-EQUIPPED DIESELS  
GIVE QUICK DEPENDABLE  
*All-weather* STARTS**

Start 'em up in Arctic cold. Start 'em up in tropic heat. Start 'em up in any kind of temperature or climatic condition. If it's a Diesel with the Lanova Combustion System, you can be sure of instant power when you need it. Tests have shown that quick, responsive starting is a characteristic of the Lanova System. It's an important reason why you'll want to specify this well-known energy cell principle in your next Diesel.

The Lanova Combustion System is available only in Diesels manufactured by Lanova licensees. We'll be glad to furnish you with the complete list of the leading engine manufacturers who offer it.

**AND LOOK AT THESE OTHER FEATURES**

The Lanova design gives a Diesel many other desirable characteristics such as—  
—even rates of combustion pressure build-up—excellent combustion efficiencies—  
—clean exhaust—smooth, powerful application of working pressures to the piston—  
—low maintenance costs—lower piston temperatures. They all add up to a better, more dependable Diesel.

**LANOVA CORPORATION**  
38-19 30th Street, Long Island City 1, N. Y.

**LANOVA** *makes Diesels purr*

## THE WORLD'S

*Most Versatile*

## EXCHANGER



### NOW MASS-PRODUCED AT LOW UNIT COST AND CONTINUALLY CARRIED IN STOCK

● It didn't happen overnight. More than 150,000 Ross "BCF" Exchangers, placed into service during the past few years, set the pattern.

For, with such a large number of units doing a cooling, heating or condensing job in practically every type of industry, Ross was able to make thoroughly conclusive observations. A definite trend became apparent in the selection of individual assemblies from standardized "BCF" parts. Thirteen sizes and sets of dimensions clearly established themselves as the needs of the majority, as did certain refinements in construction and advancements in thermal engineering gained through practical observations in the field.

Thus, with the will of the majority expressed, these most-wanted features have become standardized in the new "BCF" All-Nonferrous Exchanger, now mass-produced for low unit cost, and continually stocked at the Ross plant for prompt shipment.

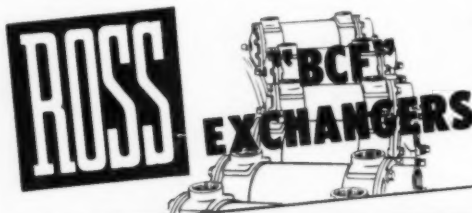
So whether you're a builder of primary equipment, furnishing exchangers with your units as original accessories, or whether you're an actual user of heat transfer equipment, you can be sure of more BTUs transferred per dollar invested with a mass-produced "BCF" than with any other exchanger.

**\* NEW BOOKLET—FREE**  
Eight pages illustrate and summarize your benefits from the new "BCF". Ask for Bulletin 1.1K1 on your letterhead.

**Ross Heater & Mfg. Co., Inc.**  
Division of AMERICAN ROSS & Standard Machinery Corporation

1425 WEST AVE. BUFFALO 13, N. Y.

In Canada, Horton Steel Works, Ltd., Fort Erie, Ont.



*Serving home and industry*

AMERICAN ROSS & STANDARD MACHINERY CORPORATION • BUFFALO, N. Y. • DIVISION OF AMERICAN ROSS & STANDARD MACHINERY CORPORATION • BUFFALO, N. Y. • DIVISION OF AMERICAN ROSS & STANDARD MACHINERY CORPORATION • BUFFALO, N. Y.



## Twin Disc Performance and Twin Disc Service

Twin Disc Hydraulic Drives—Couplings, Power Take-offs and Torque Converters—combine perfectly with most internal combustion engines to deliver a smooth, flexible, non-stalling flow of power to your equipment.

This is only half of Twin Disc's perfect combination. This performance is backed up by a comprehensive nationwide service organization that has five factory branches and 54 Authorized Twin Disc Parts Stations as its basis.

These Parts Stations maintain complete stocks of Twin Disc parts in usual demand . . . have facilities for repairing and overhauling all Twin Disc Friction Clutches and Hydraulic Drives . . . are staffed by factory-trained engineers and mechanics.

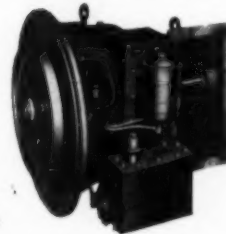
Availability of replacement parts and convenient, reliable service are as important to you as the performance of Twin Disc units. Together, they can't be beat . . . they assure you efficient, uninterrupted power transmission for your equipment.

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

At left: Hydraulic Power  
Take-off



Hydraulic Coupling

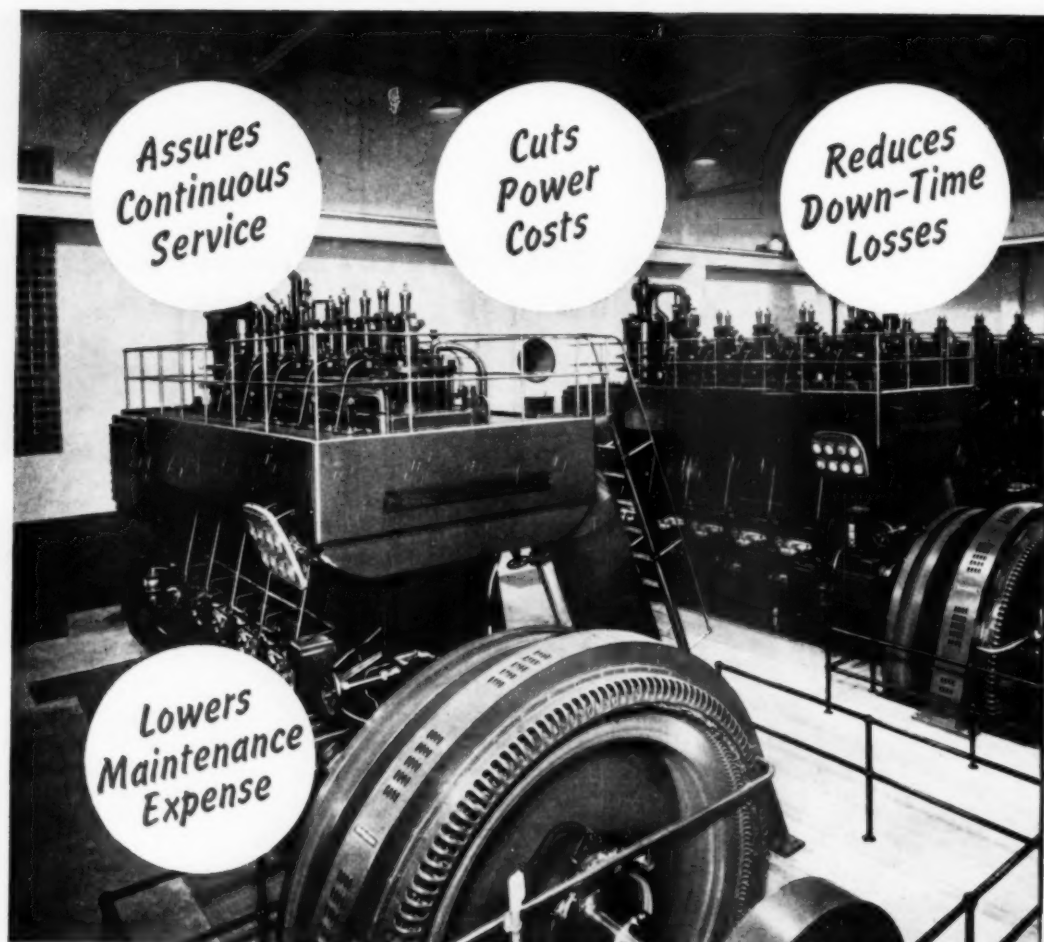


Hydraulic  
Torque Converter



**SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918**

# Piston Rings Don't Use SINCLAIR

**SINCLAIR**

YOUR NEAREST SINCLAIR AGENT WILL GLADLY ARRANGE

# Stick When Diesels GASCON OIL

One of the problems of diesel engine operation is loss of power . . . with a consequent increase in cost of operation . . . due to piston rings sticking.

Sinclair GASCON oil solves this problem by restricting the accumulation of harmful sludge in all parts of the engine. GASCON keeps rings free from deposits and provides effective power seal. Furthermore, diesels are assured of positive valve action with full area seating.



Continual research explains the high quality of GASCON and other Sinclair Oils. Sinclair has recently completed at Harvey, Ill., one of the most modern and complete laboratories for petroleum research and development.

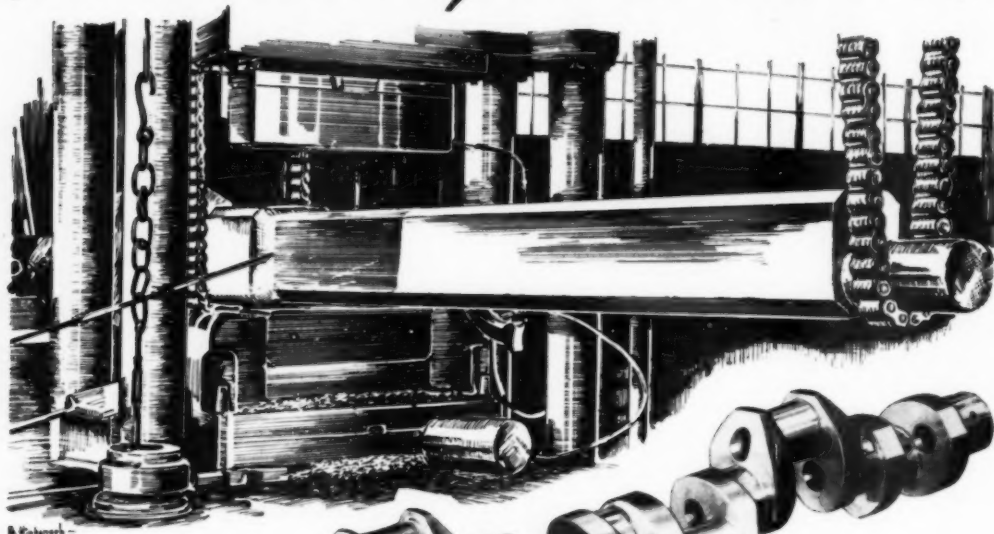


E. W. Isom, Sinclair Vice-President in Charge of Research says: "With the new facilities now made available to us at Harvey, Ill., we expect to find many ways to help industry cut costs through better petroleum products."

## INDUSTRIAL OILS

FOR LUBRICATION COUNSEL, OR YOU MAY WRITE TO SINCLAIR REFINING COMPANY, 630 FIFTH AVE., NEW YORK 20, N. Y.

## *from INGOT to finished CRANK*



### *One Control ~ One Responsibility*

CRANKS, connecting rods, drive shafts and steel castings from Erie Forge Company get the degree of watchful "follow-through" possible only under one control and one responsibility. Supervision of raw material selection, melting of steel, metallurgical control, engineering design and manufacturing craftsmanship team up perfectly to result in products which are superior. Superior because their record of performance in every kind of diesel engine service proves that it pays to insist on highest quality material and craftsmanship from Ingot to Finished Crank. Perhaps that accounts for the wide preference for the products of Erie Forge Company. Consult with Erie Engineers on your specification requirements. We can help you.

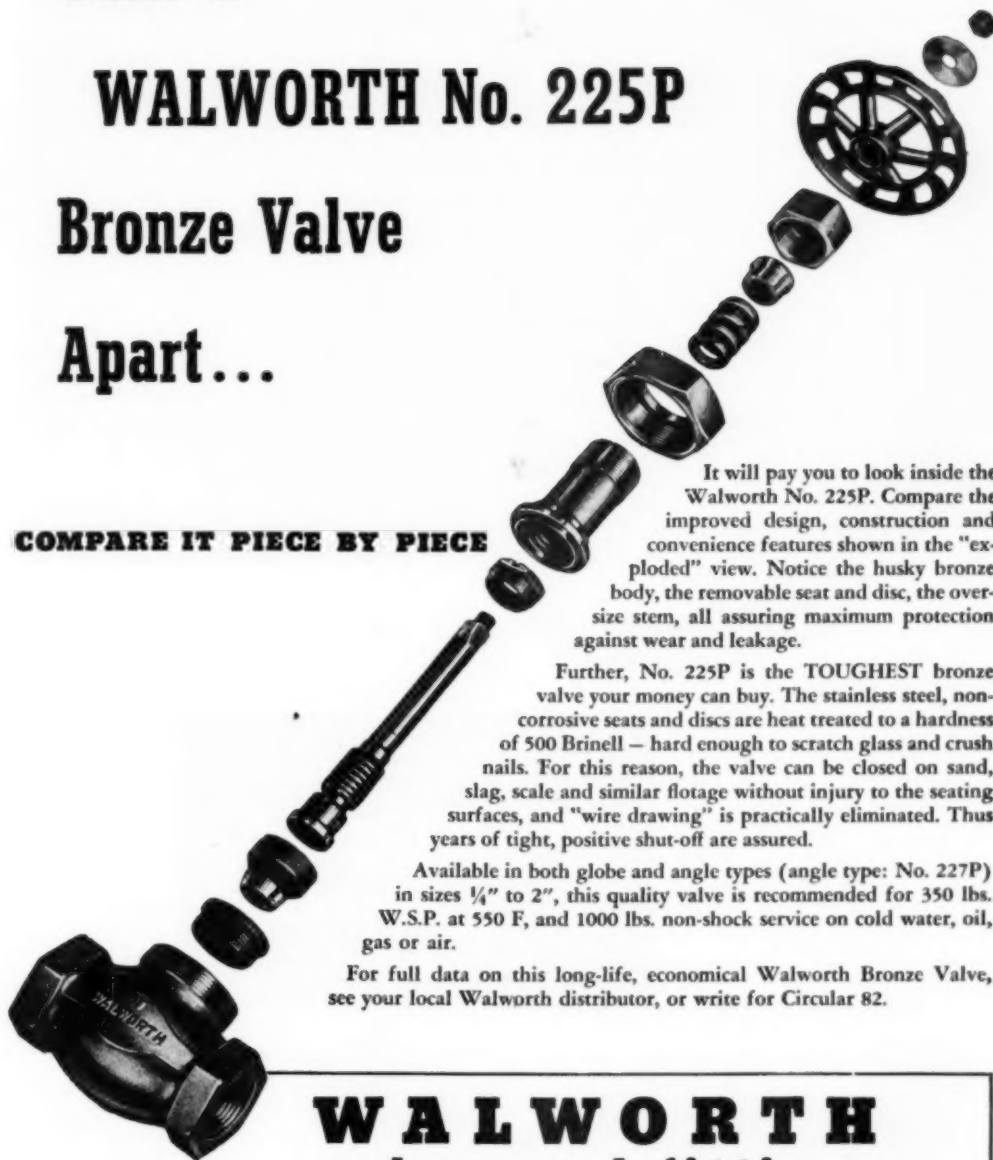


**ERIE FORGE COMPANY, ERIE, PA.**



Take a  
**WALWORTH No. 225P**  
 Bronze Valve  
 Apart...

**COMPARE IT PIECE BY PIECE**



It will pay you to look inside the Walworth No. 225P. Compare the improved design, construction and convenience features shown in the "exploded" view. Notice the husky bronze body, the removable seat and disc, the over-size stem, all assuring maximum protection against wear and leakage.

Further, No. 225P is the **TOUGHEST** bronze valve your money can buy. The stainless steel, non-corrosive seats and discs are heat treated to a hardness of 500 Brinell — hard enough to scratch glass and crush nails. For this reason, the valve can be closed on sand, slag, scale and similar flotsam without injury to the seating surfaces, and "wire drawing" is practically eliminated. Thus years of tight, positive shut-off are assured.

Available in both globe and angle types (angle type: No. 227P) in sizes 1/4" to 2", this quality valve is recommended for 350 lbs. W.S.P. at 550 F, and 1000 lbs. non-shock service on cold water, oil, gas or air.

For full data on this long-life, economical Walworth Bronze Valve, see your local Walworth distributor, or write for Circular 82.

**WALWORTH**  
 valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

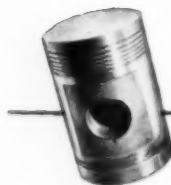
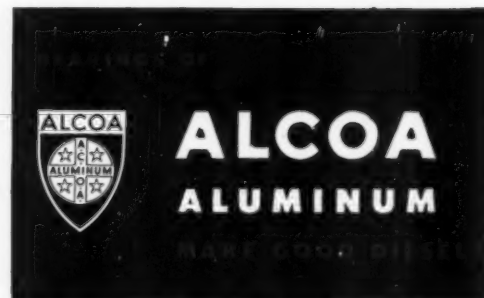
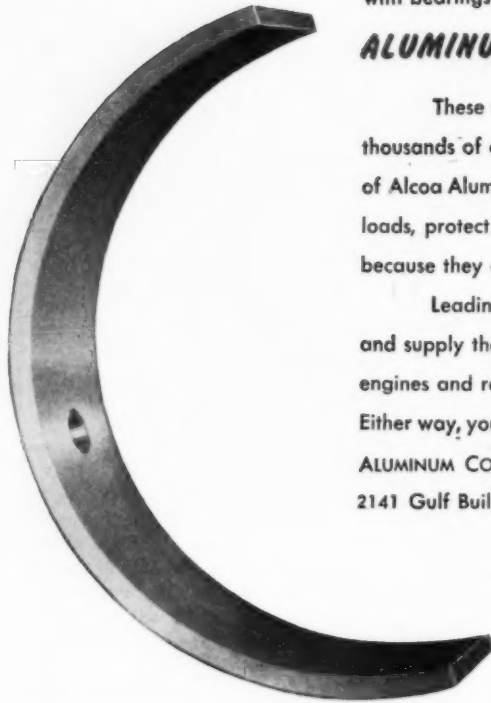
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

● Your diesels may safely benefit from highly additive oils when equipped with bearings of Alcoa Aluminum.

### **ALUMINUM BEARINGS RESIST CORROSION**

These are facts from the experience of thousands of diesel operators. Bearings of Alcoa Aluminum remove heat rapidly, carry heavy loads, protect crankshafts best because they are bearing metal all the way through.

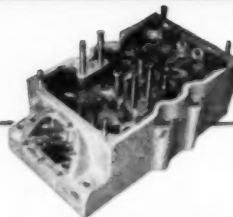
Leading bearing manufacturers finish and supply these quality castings for use in new engines and replacement in older models. Either way, you get extra availability from your diesels. ALUMINUM COMPANY OF AMERICA, 2141 Gulf Building, Pittsburgh 19, Pennsylvania.



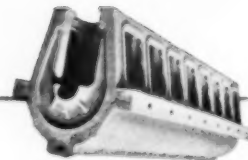
**PISTONS**—Get the proved advantages you've enjoyed in Alcoa Aluminum Pistons, in these other diesel parts.



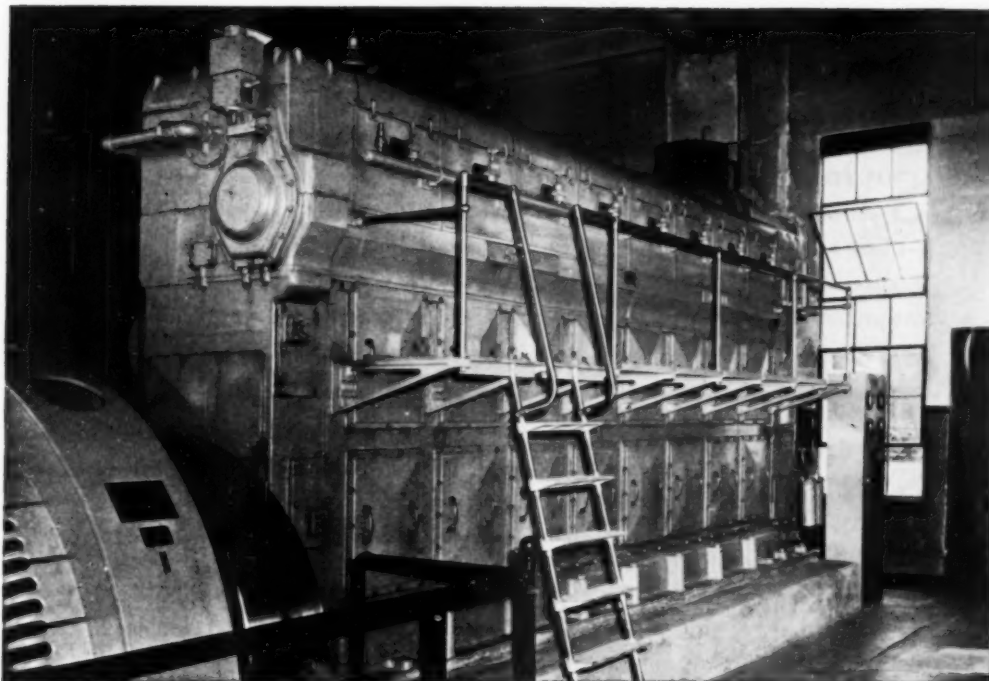
**CYLINDER HEADS** of Alcoa Aluminum—better heat distribution allows increased engine ratings. Lighter weight, easier servicing.



**CRANKCASES AND FRAMES**—the lighter weight of crankcases and frames of Alcoa Aluminum gives your diesel a higher horsepower-weight ratio.



**SUPERCHARGING AND SCAVENGING** are more efficient through the use of aluminum. Here, too, diesels can save weight with Alcoa Aluminum.



## THERE'LL BE SOME CHANGES MADE

Many communities and industries, located near a source of natural gas, are getting lower cost electric power with dual fuel Superior Diesel Engines. The dual fuel feature offered by Superior enables them to burn low cost gas in the summer and switch to oil in winter when gas is in short supply. Superior... the first Diesel with push-button control of fuel selection permits you to change from oil to gas, or gas to oil instantly... with just a flick of a finger.

There are many other Superior operating

economies that are due to the following features: Conservative Ratings • Fuel Economy • Precision Bearings • Heavy Rigid Crankshafts • Strong Bases and Cylinder Blocks • Proved Roller Chain Camshaft Drive • Oil Cooled Pistons. One of our field engineers will be glad to show you the advantages of these features, or we will be glad to send you a fully illustrated booklet.

**THE NATIONAL SUPPLY COMPANY**  
SUPERIOR ENGINE DIVISION

Plant and General Sales Office: Springfield, Ohio



*Superior*  
**DIESEL**

# Cycoil protects engines from D.T.'s

**S**HUTDOWNS, costly repairs, lost operating time—all may be symptoms of \*Dust Troubles. And every engine or compressor is susceptible to this airborne affliction unless given positive intake air protection.

Experienced operators have found the Cycoil† Oil Bath Cleaner to be the best preventive medicine against dust damage. Cycoil delivers practically 100% dust-removal efficiency—it's a heavy-duty oil bath cleaner built for long wear and exacting service. Over 90% of the fine dust content in the air is trapped in oil and removed

by centrifugal action before reaching the filter. Additional action of filtering pads plus positive oil circulation for self-cleaning action gives approximately 100% dust-free air.

Cycoil's first-line protection against dust costs little compared to the investment it guards. For the facts, write to AAF for Bulletin 130-D.

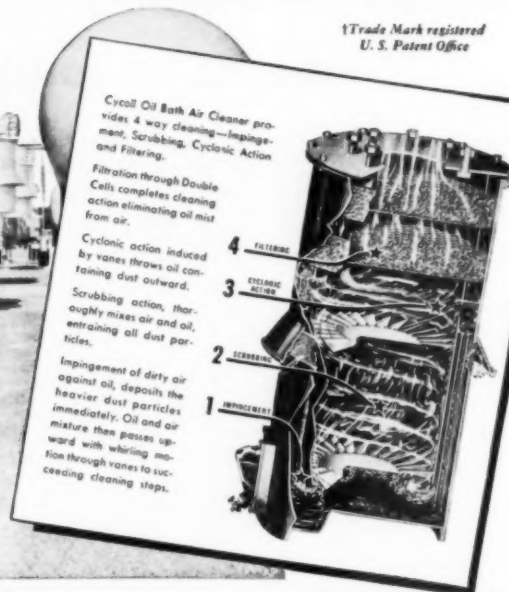
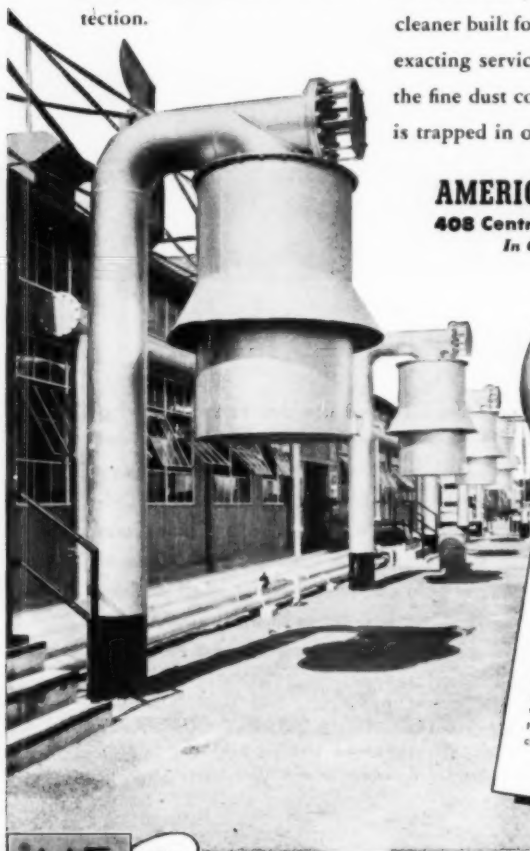
## AMERICAN AIR FILTER COMPANY, INC.

408 Central Avenue

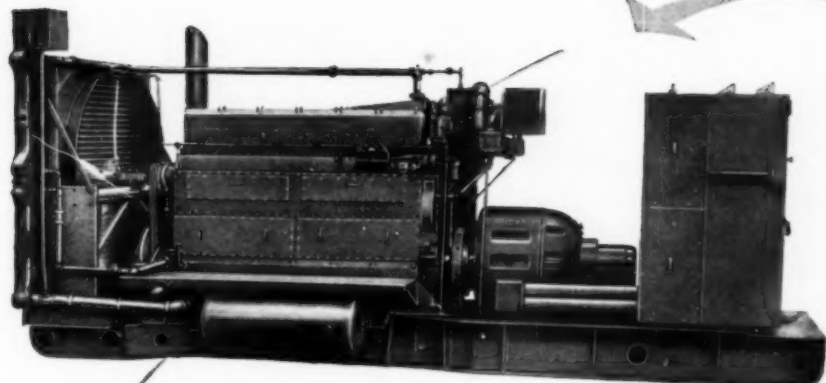
Louisville 8, Ky.

In Canada: Darling Bros., Ltd., Montreal, P. Q.

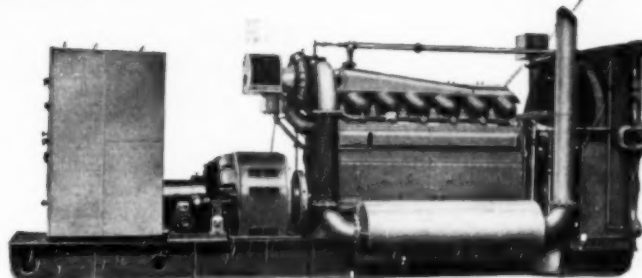
†Trade Mark registered  
U. S. Patent Office



# Cycoil OIL BATH AIR CLEANER AND INTAKE SILENCER



## NEWEST of the CP Diesel or Dual-Fuel-Electric Package Units



REAR VIEW OF 500 KW UNIT

### EFFICIENCY PLUS ECONOMY

**LOW FUEL CONSUMPTION** results from efficient design of combustion chamber, valve mechanism and fuel injection system.

**INSTANTANEOUS STARTING** is assured by simple starting valve which admits air through distributor. The distributor, in turn, admits air at timed intervals to each cylinder.

**DUST-TIGHT COVERS** completely enclose all wearing parts, but are easily removed for inspection.

**LUBRICATION** is completely automatic force feed, resulting in exceptionally low maintenance.

**EVERY PART** is designed with ample strength for maximum rigidity with minimum weight assuring long service life.

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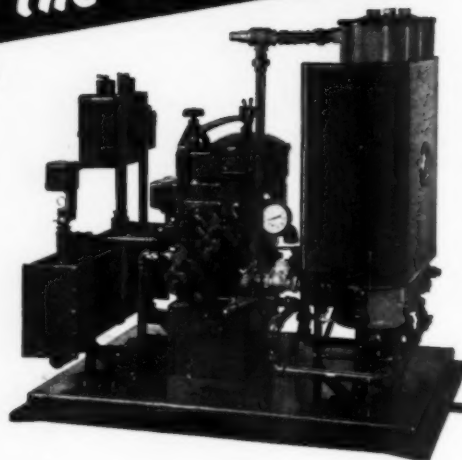
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All removed by the "PURI-FILTER"



THE DE LAVAL "Puri-Filter" removes all three major contaminants of Diesel lubricating oil: dirt, water and colloidal carbon. The first two are separated from the oil by centrifugal force in the bowl of the De Laval Oil Purifier—the water being discharged continuously. The colloidal carbon is filtered out of the purified oil by the filters.

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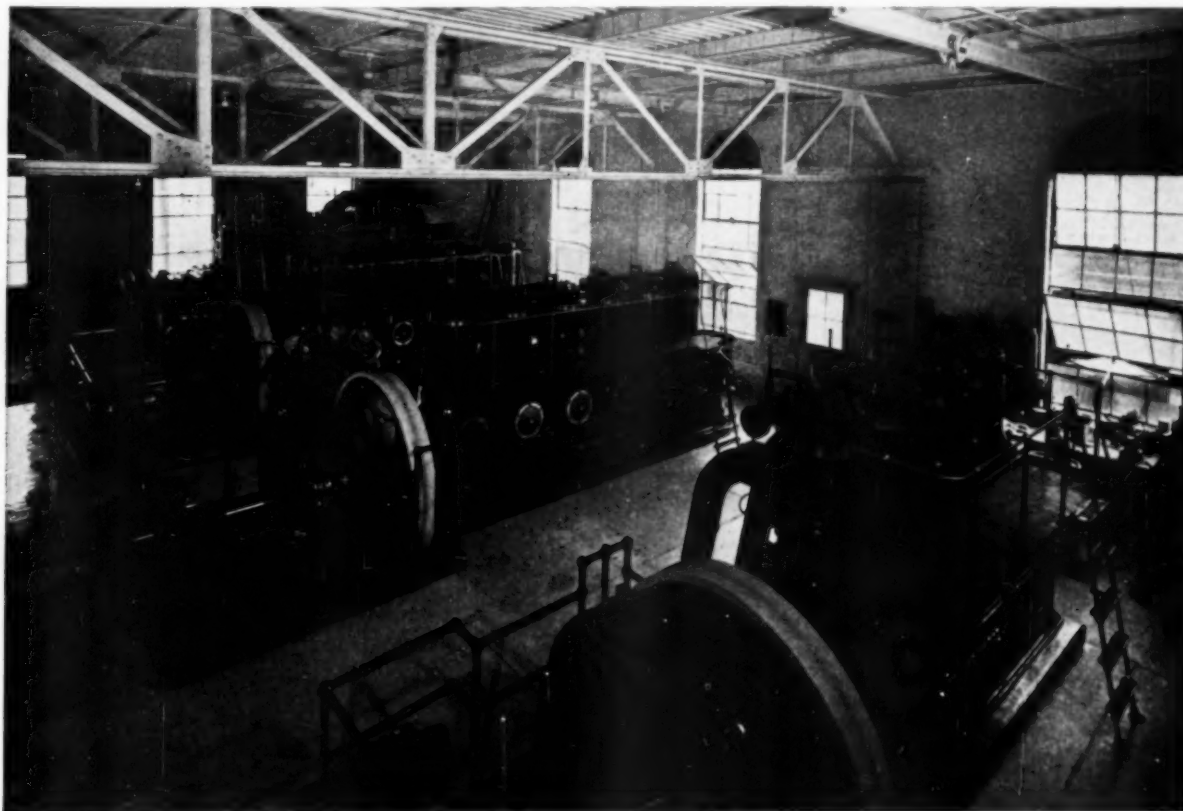
Crank cases remain clean when Diesel oil is "Puri-Filtered." Write for Bulletin DL-1, which gives additional details.

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## **An 81.6% load factor... but no maintenance problem**

THE LOAD FACTOR of 73.9% in 1946 increased to 81.6% in 1947 at the power and light plant of Harrisonville, Missouri. During these two years of operating at near capacity, there was no problem of increased downtime and maintenance. A recent inspection of the plant's four Fairbanks-Morse Diesels showed:

Exhaust ports were clear of carbon. Piston rings were not scuffed and showed very little wear. Ring grooves were clean and free of corrosion. Cylinders were in excellent condition.

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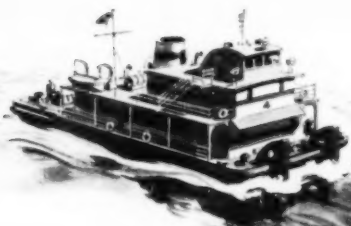
If your plant is located in the Midwest, write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, to secure the services of the Standard Oil Lubrication Engineer nearest you.

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## Are you up on your tows?

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### FRONT COVER ILLUSTRATION

An eastbound Great Northern Railway freight train coursing through the Columbia River Valley near Rock Island, Wash. The locomotive is a four-unit 6000-hp. Electro-Motive diesel-electric.

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# AMBIDEXTROUS DIESELS MIX AND

By DOUGLAS SHEARING

**ONE** million, one hundred and sixty thousand yards of concrete were delivered by the Colonial Sand and Stone Co., Inc., in 1947. The company's nearest competitor handled slightly more than half of this total.

The Colonial Sand and Stone Co., Inc., is the largest dealer in concrete, sand and cinders in the world. It serves the metropolitan area lying within a thirty mile radius of Flushing, New York, and includes Nassau and Suffolk counties on Long Island and Westchester and Putnam counties as well as the southern part of Fairfield County in Connecticut.

The bulk of Colonial's business is concentrated in New York City and its environs. Idlewild Airport and the Brooklyn Battery Tunnel have used great quantities of concrete. Idlewild alone was responsible for several hundred thousand yards of concrete delivered in one order.

One of the centers of operation is at Flushing where material arrives by barge. Here stocks of building materials are stored. Distribution of this sand and concrete is accomplished by a large fleet of diesel trucks.

Colonial discovered long ago that diesels were musts for this type of heavy hauling. This was especially true in the case of the mixer trucks, which, in addition to hauling heavy loads of concrete, had to have enough power to mix the concrete en route.

At the present time Colonial has over 300 diesel engine trucks in service. Of this total, 220 are Cummins diesel-engined. The remainder are Mack- and Hercules-engined.

The job of keeping all these diesels rolling is no easy task. The company has realized for a long time that proper maintenance is the key to a successful operation. No trouble is spared to make this maintenance program a vital part of the Company's entire operation and Colonial maintains extensive facilities in Long Island City, New York for repair and maintenance.

These maintenance shops are fully equipped to

handle any repair required for any of the 300-odd trucks in the fleet. A machine shop, a welding shop, spare parts department, and an engine repair shop are all included under one roof. Fifty-eight trained automotive mechanics are regularly employed.

A talk with the superintendent of maintenance revealed that the entire maintenance program is based on a system of daily reports by each driver and by a rigid system of check-ups at 15-day intervals, which consist of inspection and a change in lubricant if necessary. The dump trucks as distinguished from the mixing trucks operate on a 20-day schedule. Crankcase oil is changed when it becomes dirty or diluted. Used crankcase oil is collected and kept for chain lubrication. It has been found that constant lubrication of the chain drives and power take-off drives has extended the life of this equipment considerably.

A Lukenheimer oiler with a petcock has been installed over the chain drives and is set to deliver a certain amount of oil by gravity feed to the chain as it passes over the sprocket.

Each engine, as soon as it is purchased, is completely checked and an Engine Life Card is filled out which contains all the pertinent data. This includes the date of purchase, engine make, number of cylinders, bore and stroke, and engine serial number. In addition a special number is assigned the engine for repair purposes. The remainder of the card contains a record in tabular form of engine dimensions such as main bearing diameters, connecting rod throw diameters, cylinder bore diameters and camshaft bearing clearances. In addition space is reserved for measurements of oversize bores, piston ring history, valves and valve spring data and other information. The card also maintains a record of mileage run by the engine and the reasons for repair together with the date of each repair and installation.

This engine life card is kept on file together with all the individual job cards, making a complete record of the engine's history.

Fuel injection equipment comes in for very complete maintenance. Colonial believes that proper

care of fuel and fuel injection equipment is the most vital factor in successful operation. The company maintains complete servicing facilities for Cummins and American-Bosch injection equipment, and have reserved a section of the shops just for this work. Several expert mechanics are assigned the task of keeping the injection equipment in good condition.

The proper maintenance of fuel injection equipment is aided by a foolproof system of fuel filtration. Colonial uses No. 1 fuel oil with a 48 cetane rating. Before the oil is put into the fuel tank of a truck it is filtered. Before the fuel reaches the injector it passes through two more filters arranged in series. The management has found that this double precaution has paid dividends in reduced maintenance. Purolator micronite type filters are



# D MOVE CONCRETE



Cummins-engined Federal Mixer Truck

View of Colonial Maintenance Shop in Long Island City.



Vital part of Colonial's maintenance program is Engine Life Card seen below.

OVERSIZE BORES						CON. ROD THROW DIA.						REMARKS
1	2	3	4	5	6	1	2	3	4	5	6	
NEW CRANKSHAFT												ENGINE LIFE CARD
MAIN BEARING DIA.						MAKE RINGS INSTALLED						
MAKE BEARINGS CON. ROD						MAKE BEARINGS MAINS						
CON. RODS RECONDITIONED						CAMSHAFT OIL OR NEW						
VALVE SPRINGS						CAMSHAFT BEARINGS						
VALVE DATA						TOTAL MILES RUN						
DATE REPAIRED						REASON FOR REPAIR						
DATE INSTALLED						FROM TRUCK NO.						
						TO TRUCK NO.						

(WRITE ADDITIONAL DATA ON REVERSE SIDE)

used for this service and have been found to be well suited for this application.

The lubricating oil used by the diesels is Paragon HD 30. For breaking in new or rebuilt engines a number 10 weight oil is used. Winter weight oil is 20 S.A.E. As mentioned before used lube oil is utilized for lubricating drive chains and power take-offs.

Winter weather and the necessity of parking these diesels out of doors have led to problems in starting. At present the company is installing spark ignited manifold heaters on all the diesels not so equipped. This method of preheating the cylinders has proved very successful.

Operating as they do under very dusty conditions

air filtration is very important as a wear preventing measure. Colonial utilizes Donaldson air cleaners for this service.

The Colonial shops have excellent machine shop equipment and can turn out parts for any piece of equipment used by the firm. Complete engine rebuilding facilities are at hand. When an engine is in need of repair and rebuilding it is taken out of the truck and a rebuilt engine is installed. The company has two replacement engines on hand at all times for each of the six types of engines used in the trucks. These include Mack, Hercules, and Cummins. The Cummins engines range from 100 hp. to 200 hp. with the bulk of these in the 150 hp. range.

All engine modifications such as the addition of

air compressors, heaters, and other equipment are accomplished by the shop personnel.

Some remarkable engine performances have been recorded by the concern. Many of the diesels have not been removed from the trucks for over four years. One Cummins engine has been in service since 1938. Performances such as this are remarkable when the type of service is considered. The engines of the mixer trucks are subject to overloads continually since in addition to powering the truck they drive the mixer drum containing anywhere from 5 to 8 yards of concrete.

Colonial's outstanding success with diesels is more than partly due to the intelligent and resourceful use of maintenance procedures which have been developed after long experience.

## DIESELS ON MOUNT WILSON



Pasadena Star News photo  
Panoramic view of Mount Wilson showing concentration of broadcasting stations left to right, KLAC, KFI, then KECA being built; center foreground is Southern California Telephone Co. station, back of it is F-M station KFMV and next right is KNBH then KTTV and the famous observatory.

By FRED M. BURT

**F**AMED for years as the site of the Observatory with the 100 in. mirror, and surrounding recreation area, Mount Wilson today also has the world's greatest concentration of Television and Frequency-Modulation broadcasting stations. No other similar population center has a comparable elevation so close in; about 18 miles air-line to the center of Hollywood.

Closely grouped at an elevation of nearly 5,800 ft. above sea level (almost 6,000 ft. at the top of antennae), the stations already represent an investment of more than \$5,000,000, and that is only a good start.

Each of the stations now in operation or about completed, KLAC, KFI, KECA (American Broadcasting Co.), KFMV, KTLA, KNBH (National Broadcasting Co.) and KTTV (Columbia Broadcasting Co.) has its own very complete diesel-generating set(s) to supplement the new 4400-volt, Southern California Edison Co., power line. Previously, with the inadequate 2400-volt line, much use was made of diesels, and diesel engines are still vitally necessary in case of power failure or fluctuation. Most of the units are equipped automatically to take over in a few seconds, with full power and controlled frequency. The engines are kept warm.

To give some insight into the operations, let us take the Columbia station KTTV, on the air for the first time New Year's Day, 1949, televising the Pasadena Tournament of Roses Parade and the Rose Bowl football game. On the south side

of the mountain is the telephone company station. Behind its large plexi-glass windows are large parabolic antennae or microwave relays (called "dishpans"). These were "beamed" southwest towards the parade and then the bowl. Roaming and stationary, the \$100,000 mobile television truck picked up the sight and the sound. The pictures went through the air to the "dishpans" on Mount Wilson, and the sound was relayed by cable. A re-transmission carried the pictures and sound to the KTTV-KNX station on the 14th floor of the Bekins building in Hollywood where parabolic antennae were beamed at the mountain. This allowed monitoring for announcer and commercial interpolations before beaming back to KTTV on Mount Wilson at 186,000 miles per second.

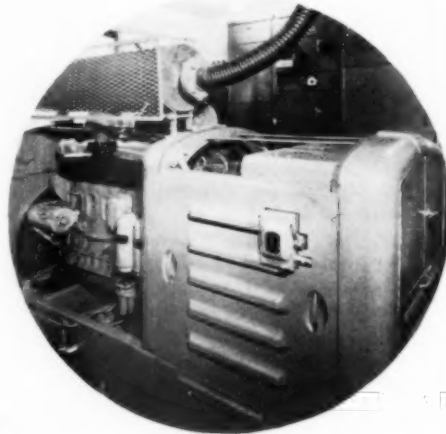
KTTV is also the KNX F-M broadcasting station, and here a series 671 General Motors, 60 kw. diesel-generating set has seen much use in supplying F-M power. It now stands back of the television set-up also, with its Type TT-5A, RCA television transmitter and console.

In order of their arrangement, east to west, next is the NBC station, KNBH, with two diesels. The 8-cyl. Buda "super-diesel" with its 125-kva. Century Alternator is used to carry the full load when broadcasting. The 4-cyl. Hill diesel with General Electric, 18.75 kva. a.c. generator, is used

to supply power at other times, for lights, refrigeration, etc.

Opposite the Buda, along the wall, are six large Exide storage batteries in series to supply a 32 volt current. The over-all installation (by King-Knight) provides an extreme in precaution against power failures.

A Calrod immersion heater in the engine cooling water keeps it at about 150°. The second that power line current drops off, the Delco Remy starting motor on the Buda automatically takes current from the batteries and turns the engine

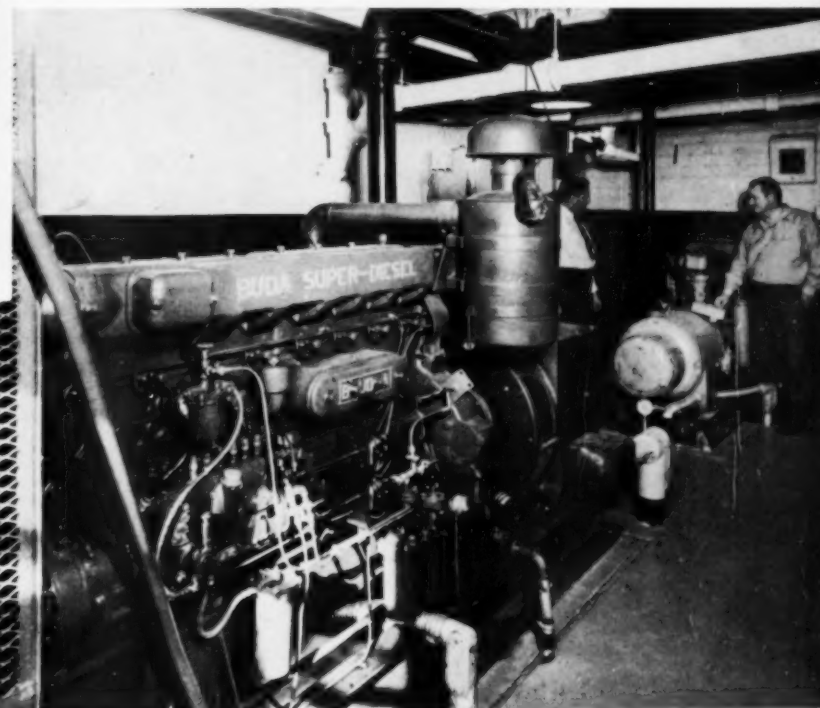


Automatically controlled 60 kw. G-M diesel-generating set for F-M and television at KTTV.



Jerry Baranek, supervisor, station KTTV, at television control panels—first three from left for sound, then power and last three for pictures. Control console, extreme right.

Power for KNBH (NBC) is supplied by Buda diesel, left, and Hill diesel, right. Seen in background are J. B. Knight, Jr. right, station engineer, and R. E. Barnes, assistant.



over for five seconds, long enough to get it going in any instance to date. However the special control provides for a five second wait and then another five second turn-over, repeating this cycle five times; then requiring a manual re-setting.

As soon as the diesel-generated power is up to voltage and frequency (in about six seconds) the transfer switch operates automatically to supply power to all lines. All power and diesels are hooked to a control panel in the main room above, close to another RCA television transmitter control board.

The oldest television station on the mountain is KTLA, presenting an odd appearance with three parabolic antennae mounted on the front of the building. While a new diesel house is under construction, the General Motors 30 kw. diesel-generating set rests outside in the snow, yet ready for instant starting with immersion-heated water.

About the biggest construction job in the bunch (by the Austin Company) is that of the American Broadcasting Company—KECA, next to the U. S. Weather Bureau building. Back of the large, main building where the control panel for automatic starting and power transfer is located, is the diesel house with the 180 hp. General Motors diesel and 100 kw. generator. On both cooling air intake and three windows, louvers control air admission through automatic operation of Modutrol motors. An item of novel construction is the



At station KTLA, this G-M diesel operates out in the snow awaiting completion of the station.

Parabolic antennae at station KTLA, beamed at points of transmittal.

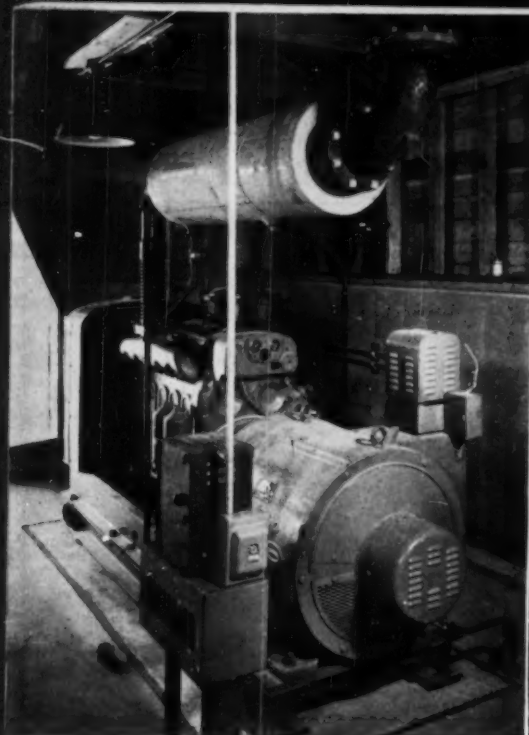


30,000 gal. concrete water tank on which the 189 ft. antennae tower is erected. This station will be in operation early in 1949.

Station KFMV (for K-Frequency Modulation Voice) does not televise, but has a very fine F-M installation. The 3-cyl. 69 hp. @ 1800 rpm. General Motors diesel with 30 kw. generator is located

outside at some distance from the building, operated by remote control. The water in the engine is kept hot with a Chromolox immersion heater set at 170°, also with some anti-freeze in the water during cold weather.

When the line current fails or fluctuates, all that is required is for the engineer to press the start-



6-M 180-hp diesel with Electric Machinery 100 kw. generator, and Maxim exhaust silencer at station KECA.



Engineer V. L. Clark, station KFI starts the small gasoline starting engine one of two Caterpillar diesel generating units.

ing button. Shortly thereafter, when the adjacent frequency and voltage meters indicate, a fast switch-over is made on the control panel.

Cliff Gill, General Manager for KFMV-Unity Broadcasting Co. gave some interesting data on this station and F-M in this area. The RCA pylon antennae, the style used for all F-M broadcasting, runs up to 5,865 ft. above sea level. An Auto-Dryaire dehydrator pumps dry air into the conduit which carries the coaxial transmitter line up into the antennae, so that no moisture and ice may accumulate.

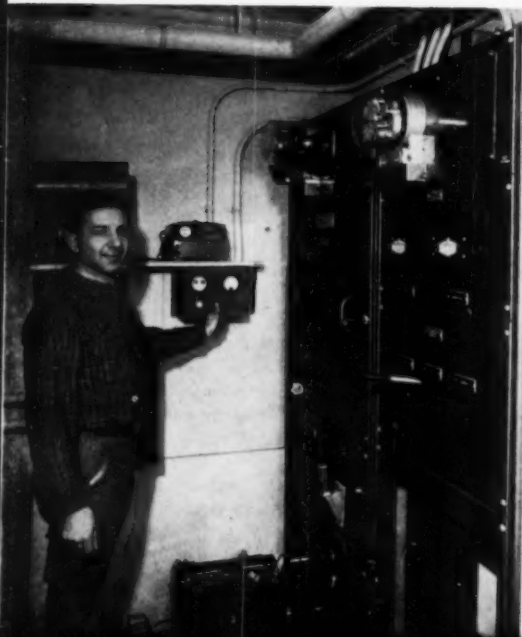
The Earle C. Anthony KFI station had been operating for some time before starting the television broadcast. Two D4600, 6-cyl. 53 hp. "Caterpillar" diesels, each driving a  $37\frac{1}{2}$  kw. Louis Allis Co. a.c. generator, are hooked up through a Mullenbach panelboard, along with Edison power, to both F-M and television transmitters.

The seventh diesel-powered station is KLAC; using a "Caterpillar" diesel electric set. The starting motor operates on 32 volt current supplied by five Willard batteries. An immersion heater keeps the water at about 140°. If the Edison

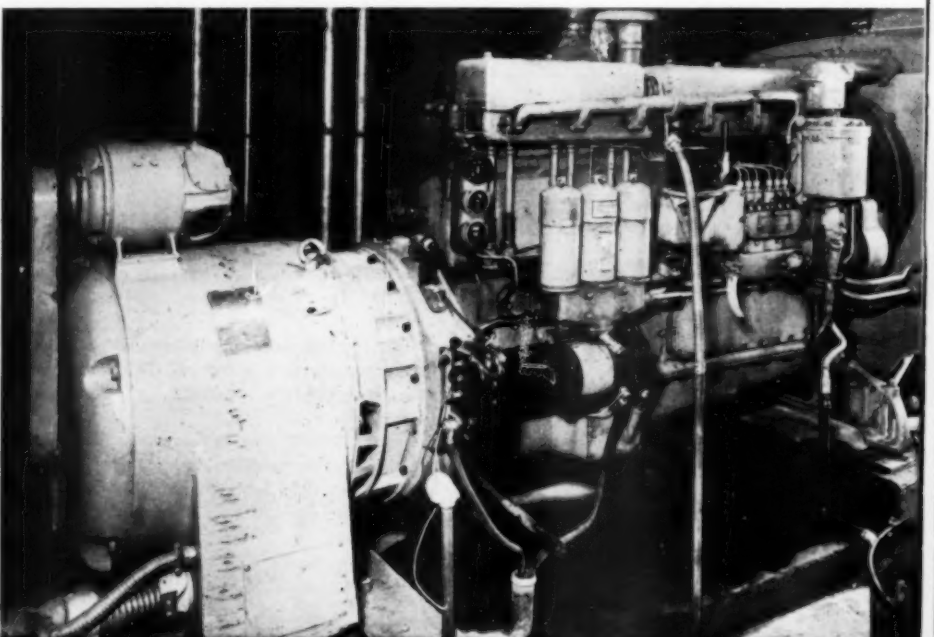
power fails, a Synchro-Start unit takes over automatically to kick off the starting motor in seven second bursts of operation, if required. Normally, diesel-generated current is ready for use at proper frequency and voltage within a few seconds.

The pioneer television station KTSL (for Thomas S. Lee) will move, early in 1949, from its 2,000 ft. elevation on "Mount Lee" just north of Hollywood, to a point some distance west of KLAC. Included in this installation will be another complete and automatically controlled diesel-generating unit.

28 Here, Sam Margolian, Chief Engineer, KFMV, is starting his diesel by remote control.



This Caterpillar diesel-generating unit at KLAC is equipped with full automatic starting and transfer, using Synchro-Start controls.



## SEA FOOD SPECIALISTS

**T**HE DeJean Packing Co. of Biloxi, Mississippi, is one of the largest independent producers of shrimp and oysters in this country and the continuous expansion with which the organization is engaged presages an even more favorable position in the industry. The company was established in Biloxi 25 years ago under the direction of Charles DeJean, Frank Bozarge and Elmer Williams. Mr. Williams retains his interest in the organization and today, with his brother, Carol E., conducts the business. Mr. DeJean has retired from active participation and Mr. Bozarge died several years ago.

From an humble beginning as a small raw shop, DeJean Packing Co. has grown so in stature that its annual output now is measured at 80,000 cases of shrimp and oysters in addition to a million pounds of frozen shrimp. These products serve every portion of the United States and Canada as well as many foreign countries. Long identified with the growth of the organization, both Elmer and Carol Williams are keenly interested in the enterprise and alert to modern business practices which are a part of an expanding business. They personally supervise the activities within their packing plant at Biloxi and share with their 250 employees—this figure exclusive of boatman—the pride of accomplishment which goes with continued growth of the business.

The character of the concern can be measured by the dispatch with which the plant recovered from a devastating hurricane a year ago to bring operations from a chaotic standstill to a maximum production within one month's time.

DeJean Packing Co. owns or leases 65 fishing vessels to harvest the volume of raw product required to maintain peak production at the Biloxi plant. In this fleet are many boats powered by "Cat" Diesel Marine Engines which have compiled

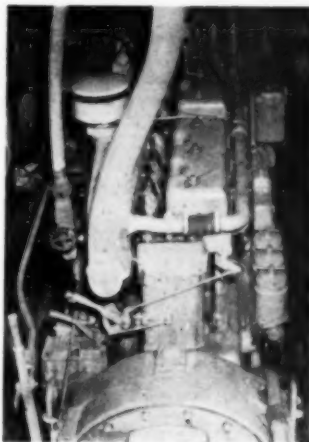
Shipyard of DeJean Packing Company which operates 65 fishing boats.

thousands of hours of dependable service in a year-around job of keeping shrimp and oysters pouring into the processing plant.

Among the fleet veterans are such craft as the "Alma Mae," the "Robert B. Faurel" and the "Peck Williams" powered by "Cat" diesel Marine Engines; the "Carl Williams," "Eustas McManus," "Brenda," "Leon Hall," "Mary Francis" and "Elmer Williams II," powered by "Cat" diesel D8800 Marine Engines.

The organization has the most modern conveyor systems to facilitate transfer of the ships' cargo to the packing plant once they have tied alongside the DeJean pier and the same modernization runs through the entire plant to provide easy and sanitary sorting, cleaning, refrigerating, canning, packing and shipping of the end products.

Unloading some of the millions of shrimp packed yearly by DeJean Packing Co.

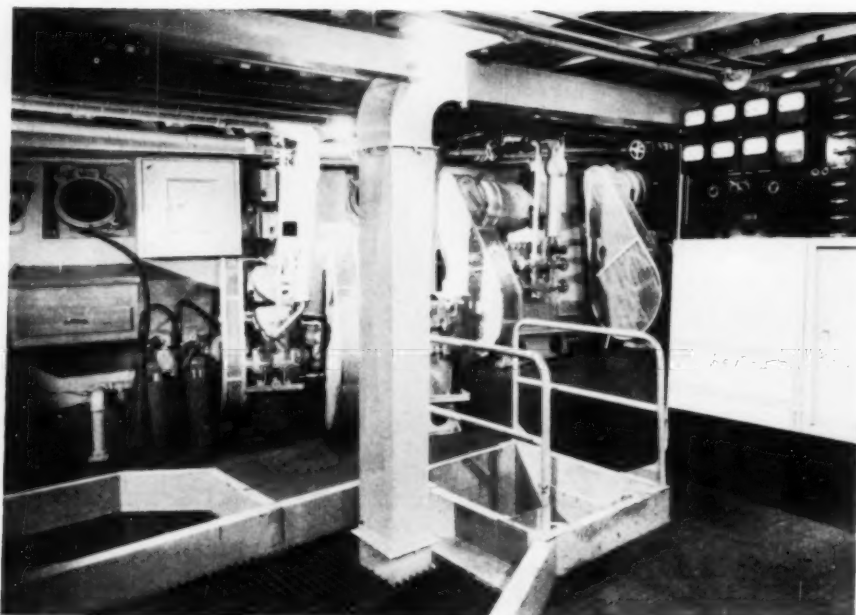


Caterpillar marine diesel installed in shrimp Peck Williams.

29

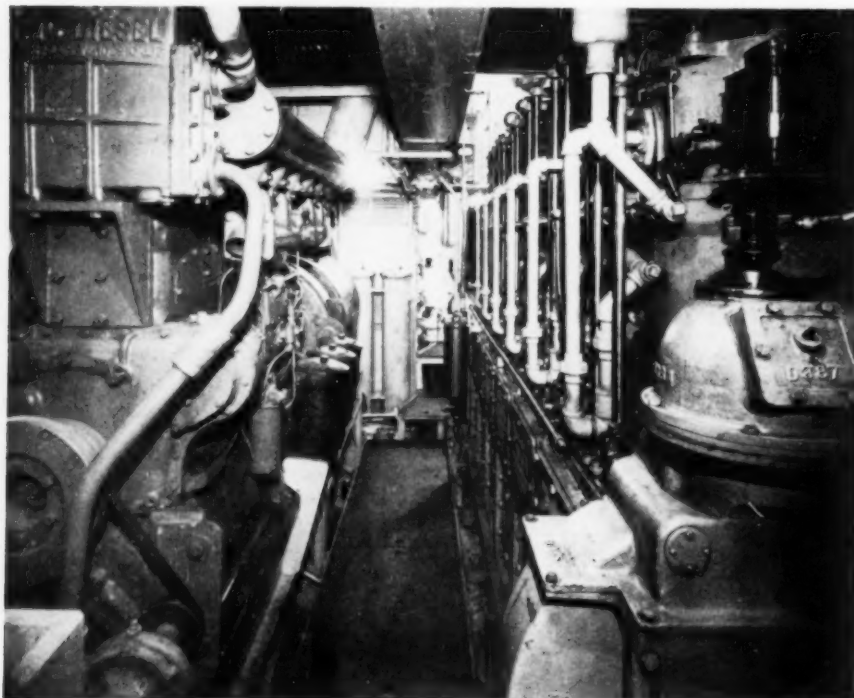


# New Baby Tuna-Clipper "CONQUEROR"



Conqueror's machinery flat with Baker ice machines shown.

Washington 330 hp, 360 rpm main propulsion diesel at right, one of two Pacific auxiliary diesels.



By CHAS. F. A. MANN

**L**AATEST addition to the San Diego tuna clipper fleet is the trim new wood and diesel *Conqueror*, built at the plant of Tacoma Boat-building Co., Inc. at Tacoma, for a syndicate headed by the ship Skipper, Capt. John Ripppo, who is likewise the vessel's Managing Owner.

As usual with this type of compact refrigerated bait fishing tuna clipper, the innards are usually crammed to the walls with fish tanks, diesel and electric machinery and what is left over is used for the crew's quarters!

*Conqueror* is 85 x 23 ft. 6 in. and has a molded depth of 11 ft. 6 in., and carries 115 tons of fish in 3 deck bait boxes (filled and refrigerated on the return trip); 2 combination oil storage tanks (used for oil outbound, frozen tuna inbound) and six regular refrigerated wooden tanks each side of the pump-shaft alley. Four of these refrigerated wooden tanks carry live bait outbound, as well as the 3-unit deck bait boxes.

The crowded main deckhouse carries the usual galley-messroom, refrigerator space for the galley, bosun's stores; machinery flat and lavatories. The semi-raised deck carries crew's accommodation for ten, including the master and engineer and the pilot house-chartroom-muffler compartment is in the pillbox compartment atop the ship. The vessel is of heavy Douglas fir and fir plywood and fancy hardwood trim construction, with the usual battleship-type hull that will stand the gaff. A 90 hp Chrysler-engined 16 ft. power launch is carried on the top deck.

The main propulsion is a 6 cyl. 11 $\frac{1}{2}$  x 15 in. four cycle 330 hp. at 360 rpm. Washington diesel, fitted with Ross Heat Exchanger and Maxim silencer. Weston tachometer is fitted, a repeater mounted in the pilot house, along with engine controls in both engine room and pilot house.

Auxiliary power load, heavy in the case of all

tuna clippers, is provided by a pair of Model 1197 Pacific 6 cyl. heavy duty diesels, with  $6\frac{1}{4}$  in. bore and  $6\frac{1}{2}$  in. stroke, developing their rated power at 144 hp. each at 900 rpm. Each drives a 75 kw. 3 phase 60 cycle 240 volt alternator, made by Electric Machinery Co. Starting is with Gardner Denver air cranking motors, hence all storage batteries are eliminated, a troublesome feature done away with for working in the tropics. Batteries fold up in the humid, high-temperature tropics. American Bosch fuel injection and built-in heat exchangers are fitted with each engine. A 10 hp. De Vilbiss air compressor supplies starting air for both the main and auxiliary diesels. "Pacific" diesels are a new type conversion job put out by a Northern California builder, using Waukesha parts as the foundation of the diesel assembly, particularly slanted for marine use. The elaborate pump layout necessary to operate this type of vessel, is largely of Peerless Pump Co. manufacture, and all 3-phase 220 volt A.C. motor driven. The pump layout includes condenser, fuel transfer, fire and deck, brine circulating, bilge,

bait, general service, etc.—some 25 pumps in all. A Master 10 hp. motor with Cutler Hammer Control drives the Northern Anchor Winch; and 3 Baker ice machines are fitted.

A Doran Airfoil type variable pitch 62 x 46 in. propeller is fitted, with Tobin Bronze tailshaft operating through a lignum vitae stern bearing. Two stern and two bow fuel tanks plus the fuel capacity of the two fish-tank wells, gives a total of 17,700 gallons diesel fuel oil capacity fully loaded. Two 325 gal. lube oil tanks are fitted, as well as 2,200 gal. fresh water storage. Two navy type anchors on cable and chain, and a Northern Anchor Winch are fitted, the latter a product manufactured by Tacoma Boatbuilding Co., Inc. A Star Machinery Co. cargo hoist is fitted; 200 gal. gasoline tank for the launch; a full flooding CO-2 piped fire extinguishing system and a Johnson worm and gear type steering gear are some of the incidentals fitted on this ship. A Fathometer, by Submarine Signal Co.; an Electronic Engineering Co. (San Diego) radio set and Hallicrafter

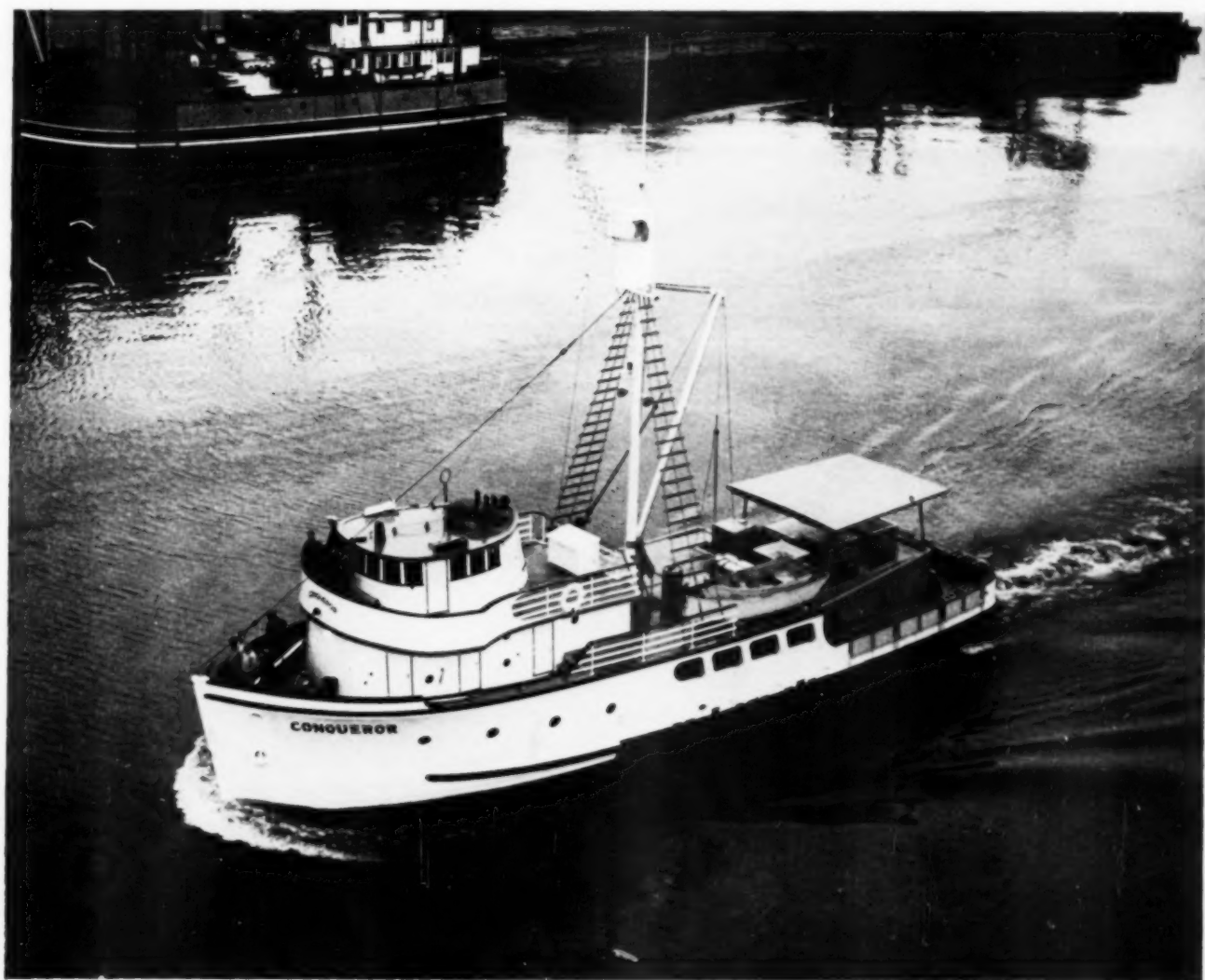
radio receiver are fitted. The refrigeration system consists of three 4-cyl. Baker compressors, with deck mounted condensers, salt water cooled, feeding over 6,000 ft. of  $1\frac{1}{4}$  in. galvanized and welded ammonia pipe. The galley has a Hughes oil burning range; galley ice box and tiled sink.

Delivery of the *Conqueror* was made November 30, and she joined the San Diego fishing fleet before Christmas.

While of the "Baby Clipper" size, the vessel ready to fish represents an investment of just over \$200,000. Her smaller capacity enables her to touch home base more frequently and earn profits by fast turnaround for medium distances offshore, as contrasted with the long-range cycle of operation carried out by the "Giant Type" Clipper, with much higher power and very large fuel capacities that will enable voyages to the far Central Pacific or South America.

The Battle of Giant vs. Baby Clippers goes on!

85-foot Baby tuna clipper *Conqueror*, built by the Tacoma Boatbuilding Co., Inc.



# NEW 24-CYLINDER, LIGHT-WEIGHT, HIGH-OUTPUT DIESEL

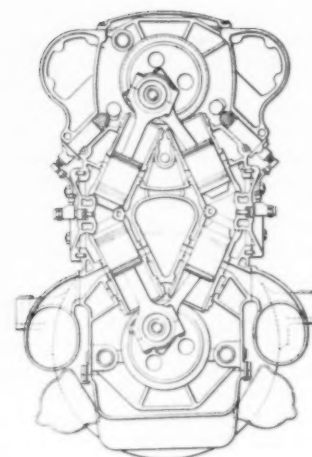
By FRED M. BURT

**W**ELL along in its development is a new light-weight, heavy-duty, diamond type diesel engine designed by Morris Development Co., Los Angeles; now available for production under license by an established engine manufacturer. This high-speed, 24-cylinder ( $3\frac{1}{4}$ " bore,  $3\frac{7}{8}$ " stroke), opposed piston, two stroke cycle diesel is designed to be equally applicable for automotive, marine, or industrial use.

Present power output under test conditions is 400-hp at  $76\frac{1}{2}$  b.m.e.p. and 1730-fpm piston speed (2650-rpm.) The indicated potential from further development is 550-hp at about 100 b.m.e.p. and 2800-rpm. However, through use of a turbo-blower and other refinements, a much greater power output may be expected.

The size is that of a large truck engine—approximately 2 ft. wide,  $4\frac{1}{2}$  ft. high,  $4\frac{1}{2}$  ft. long; weight complete, with cast iron block and all accessories, is 3300 lbs. The weight can be reduced to less than 2500 lbs. by use of an aluminum block, and still further by other simple weight-saving measures, while still retaining the ruggedness required for high-speed, heavy-duty operation. Therefore the weight ratio (at 550-hp potential) of 6-lbs. per horsepower could easily be cut to about  $4\frac{1}{2}$  lbs. per horsepower.

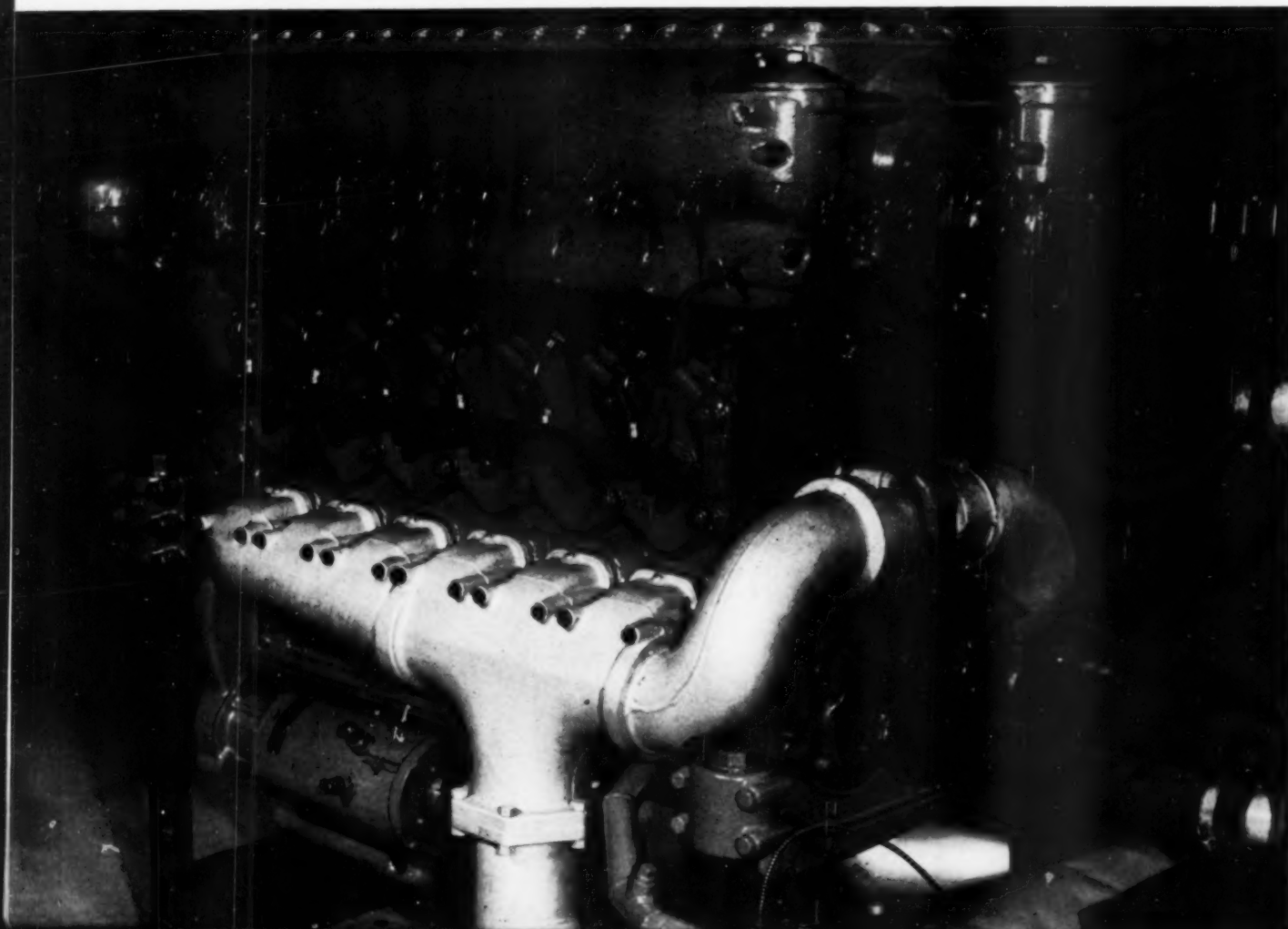
Some of the principal features of the Morris diesel are: 1) About half the usual bearing and gear loads. 2) Singly removable, heat-treated, cast iron cylinder liners of 450 Brinell hardness. 3) Chrome-plate piston rings. 4) Unusually large

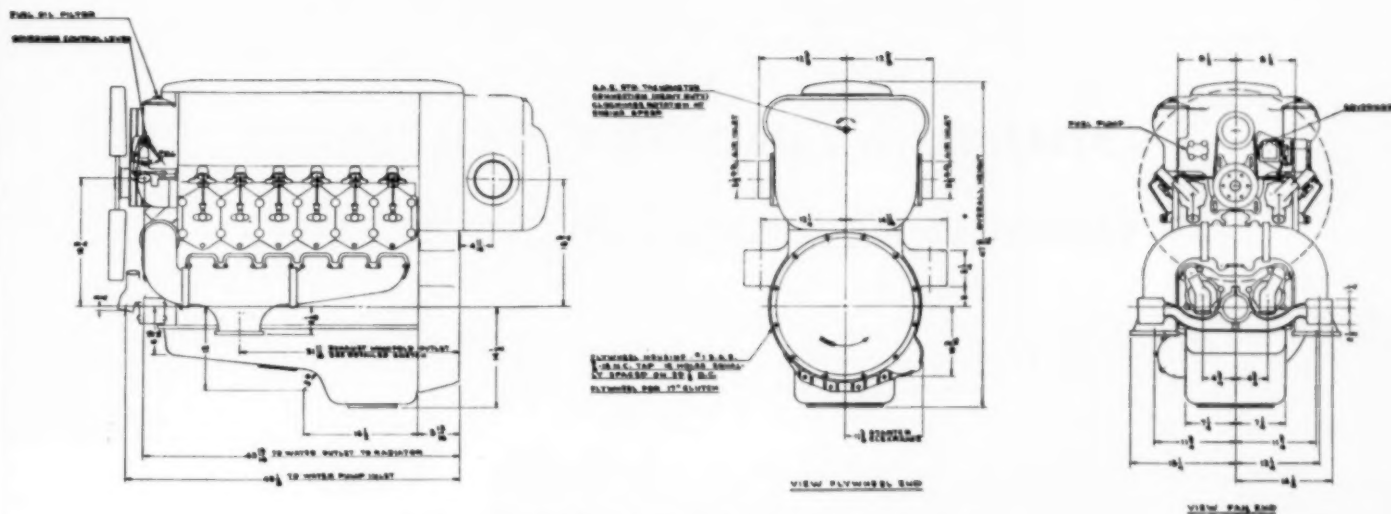


Transverse section showing arrangement of cylinders, injection pumps and nozzles.

diameter main bearings which give the crank shaft great torsional rigidity.

Of importance in maintenance or complete overhaul—two men, in eight hours, can remove and replace all pistons, rings, bearings, and/or





Dimensional drawings provide data for comparison of Morris engine with other types.

cylinder liners, or any combination thereof, including the accessory work involved. The six cover plates on each side, which are also the cylinder heads, are quickly removed by taking off fuel lines and unscrewing head nuts. Then the upper (intake) cylinder liner is slipped out, followed by similar removal of the lower (exhaust) cylinder liner.

Access to upper and lower piston and connecting rod assemblies is obtained by removal of the top cover and the crank pan. After the connecting rod bolts are unscrewed, the connecting rods and pistons are lifted out past the crankshaft. This is possible by virtue of the unusual crankshaft design. Only 12 injectors are required as there is a common combustion chamber for each pair of pistons.

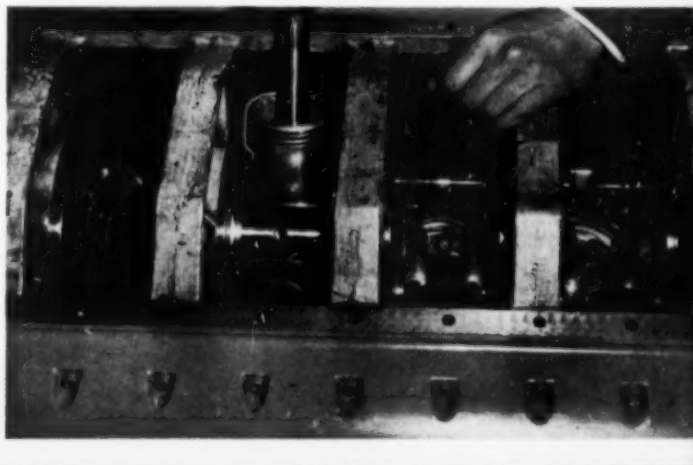
Two light-weight, high-speed "Roots" type blowers mounted above the flywheel, coupled by flexible torque shafts to the gear train, supply

air to the engine in proportion of 1.4 times the displacement. Due to greater ease of mounting and to save space and weight, two water pumps rather than one, are mounted on the front of the engine.

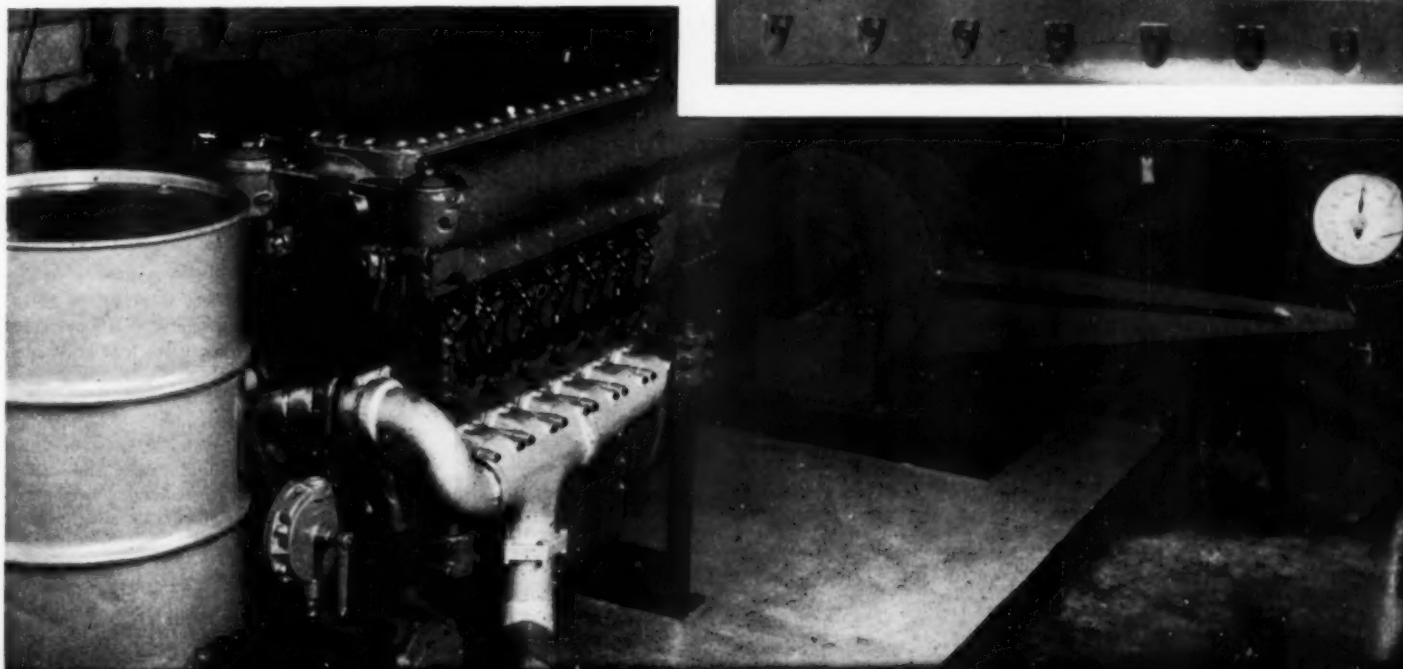
Interesting is the gearing between the crank-

shafts. A helical gear on the upper crankshaft engages a gear on the forward end of a flexible torque shaft which runs to the rear of the engine. Here a small gear is connected to a gear on the lower crankshaft through an idler gear. Use of a flexible torque shaft in connecting the two crankshafts provides against vibrations.

View showing how pistons are removed with top cover plate off.



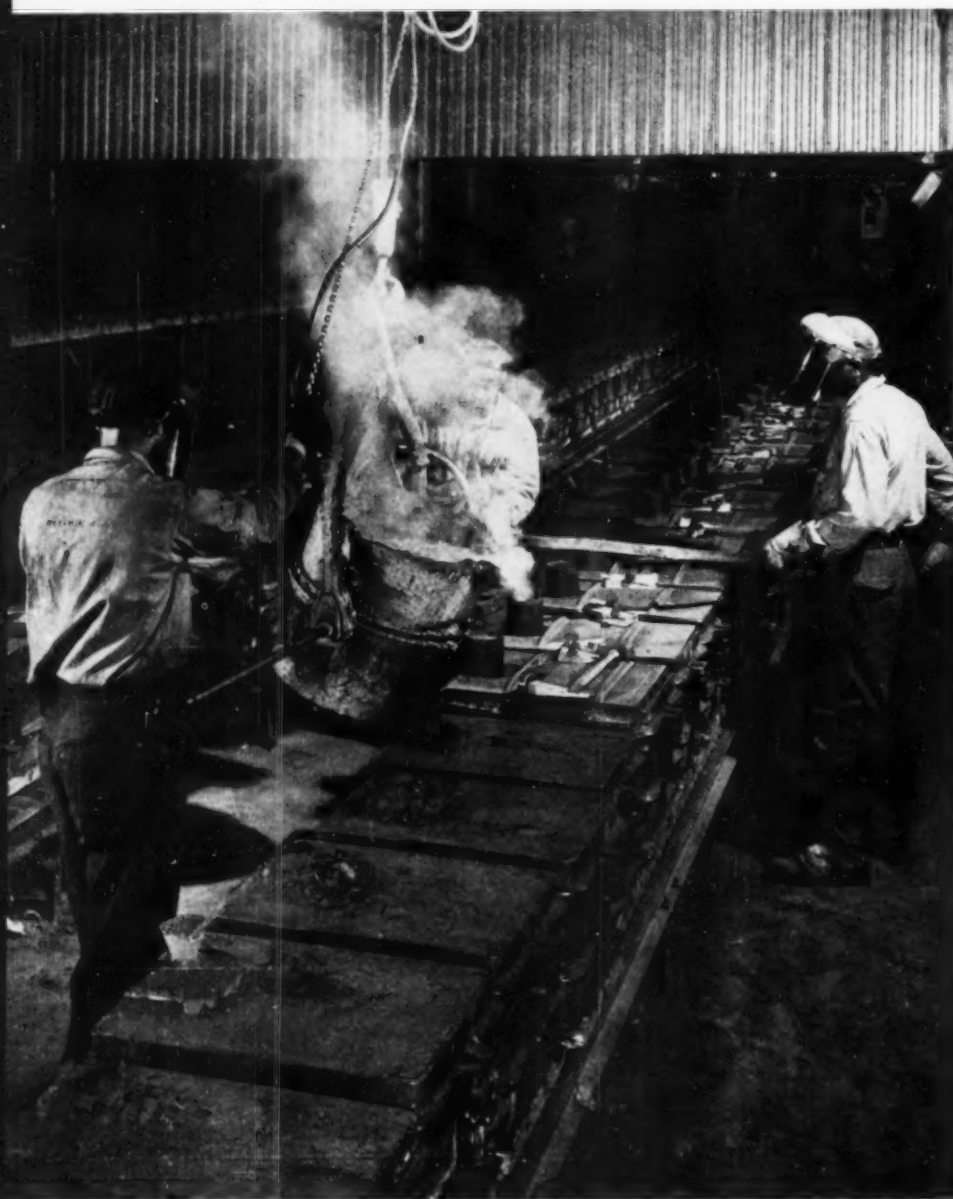
The Morris diesel on test block with dynamometer hooked up.



# MODERN FOUNDRY STRESSES

## DIESEL BEARING PRODUCTION

By DWIGHT ROBISON



Production line casting of diesel locomotive bearings at Meadville, Pa.

**N**ATIONAL Bearing Division of the American Brake Shoe Company recently opened its new non-ferrous foundry—the newest of Brake Shoe's six post-war plants—at Meadville, Pennsylvania. Having closed four old plants in the National Bearing Division, the company is concentrating production for the Eastern area in the new Meadville foundry.

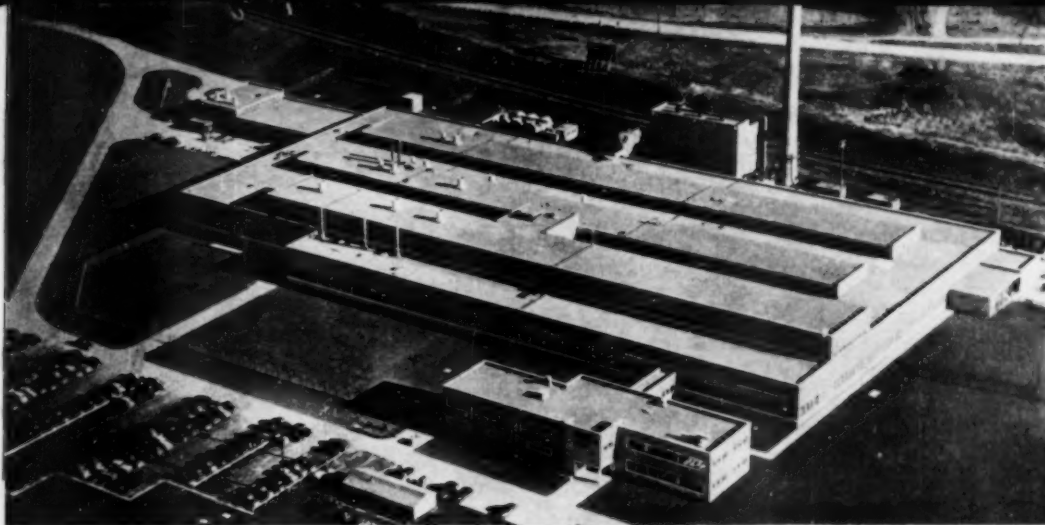
The manufacture of diesel engine bearings will soon account for twenty percent of the production output of the National Bearing Division's new Meadville foundry. Builders of diesel locomotives have increased the demand for gridded bearings to such an extent that the company has equipped an entire production line at the new plant for the sole purpose of turning out this type bearing. This is in addition to the production facilities at the St. Louis plant.

Operations have been discontinued at former plants in Jersey City, N. J., the old plant in Meadville, and two other plants in Pittsburgh, Pa. When in full production, the new foundry will greatly exceed the combined productive capacities of the four old plants. It will provide complete machining facilities which were not available in any of the old plants.

Ground was first broken for the new Meadville plant in August 1946. Construction was completed in December 1947. The new building was erected by Ragnar Benson, Inc. of Chicago, Illinois. Architects were J. Gordon Turnbull, Inc. of Cleveland, Ohio. Engineering designing of equipment and layout was jointly done by National Bearing Division's engineering staff and American Brake Shoe's Construction & Maintenance Department.

The new plant has a total of 185,245 sq. ft. of floor space or the equivalent of nearly 4½ acres under one roof. All construction is of brick, concrete and structural steel.

The two-story office and employee service building measures 200 ft. in length. It houses a fully-equipped dispensary; lunch, wash and locker rooms for employees; a metallurgical laboratory; a chemical laboratory; the engineering department, and general offices.



Air view of National Bearing Division plant at Meadville, Pa., which is most modern of its kind.



View of machine shop at new plant showing diesel engine bearings in foreground.



Aside from the great size of the plant itself (over 400 sq. ft. per employee) and its labor saving equipment, the visitor is particularly impressed with the tunnels, pipes and conveyor systems for sand handling, dust collecting equipment for ventilation, and the even diffusion of light to all parts of the building. Fluorescent lighting is used in the machine shop and incandescent lighting elsewhere.

The new Meadville plant was planned and constructed so as to provide conditions under which workers can devote their full production skill to the job. Clean, light and airy, it is equipped with the best means of material handling to eliminate back-breaking labor.

The most efficient possible ventilation has been provided in the Meadville plant. It is designed that some areas of the plant have as many as 8 changes of air a minute—others a change of air every 10 or 15 minutes, depending on the need. Air is cleansed by a dust collecting system of the wet-collecting type. Individual exhausts are located at shakeout and cleaning stations. Dust-laden air from sand handling equipment and also air from chipping benches and grinders is collected and exhausted into the outside atmosphere by 2 wet-collectors which have a capacity of 65,000 cu. ft. of air per minute. This air is not recirculated. Fresh air is always brought in. The plant has 20 power ventilators in the roof to remove smoke and gases from melting furnaces, the pouring floor, etc. These ventilators exhaust about 450,000 cu. ft. of air per minute. The plant has 21 unit heaters—17 of which introduce 20,000 cu. ft. of outside air per minute each.

Sand-handling, a laborious and dirty job in old time foundries, is entirely mechanical at Meadville. Three different systems are installed—one to handle dry sand, one to handle green sand, and an entirely separate system which is used for core sand. Sand-conditioning equipment is located in the center of the foundry. This equipment has a capacity of 20 tons of sand per hour. Sand testings are all handled in the foundry.

The new Meadville plant has a total melting capacity of approximately 200,000 lbs. a day.



Heats are made up in units of 800 lbs. and an average of 12 different alloys are poured a day (sometimes as many as 16). The department is flexible for individual furnaces which range in size from small crucible type floor furnaces which heats as low as 100 lbs. to the big reverberatory furnace which handles heats of 20,000 lbs. There is a minimum of delay in the production of either small or large special analysis castings.

The nineteen melting furnaces are both oil and gas fired. They supply metal to any point in the foundry with minimum time and travel. An automatic electrical installation controls their operations. Four recording pyrometers are used to control pouring temperatures.

Provisions have been made in the new Meadville plant for a centrifugal casting department. The department has both vertical axis and horizontal axis casting machines. The latter are tilt type machines working from horizontal to 45 deg. above horizontal. When in full production, the department will manufacture Centrifugal Castings such as bushings, gear blanks, etc. up to 40 in. in diameter and 18 in. long. A large portion

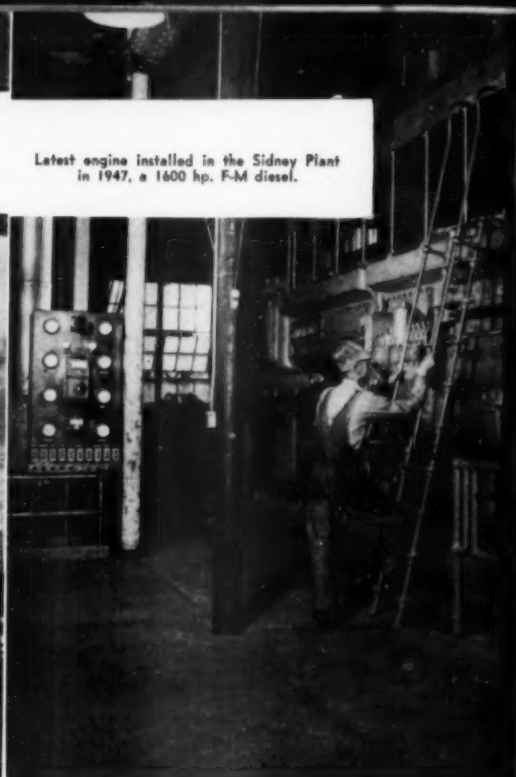
of this section will be devoted to diesel bearing casting. The machine shop has a total area of 36,400 sq. ft. of floor space. Equipped with 97 of the most modern tools for machining to close tolerances, it has a production line set-up for diesel engine and other precision type bearings as well as motor traction bearings of all types.

One entire lane is equipped with machine tools for the precision machining of diesel and similar type main, connecting rod, and piston pin bearings. Part of this section is devoted to the machining of axle and armature bearings for traction motors used on street cars, subway and railroad cars and locomotives. Tools are located here for finishing cored and solid 13 in. bars. The machine shop has departments for both electroplating and babbitt lining bearings. Traction bearings are babbitt lined by static lining. Diesel bearings are centrifugally lined.

The Laboratory at the new Meadville plant, which is made up of both Chemical and Physical laboratories, includes scientific equipment necessary for detailed, precise testing and complete chemical analysis of both raw and finished materials.



General view of the Power Plant building at Sidney, Nebraska.



Latest engine installed in the Sidney Plant in 1947, a 1600 hp. F-M diesel.

## SIDNEY TAKES OVER AGAIN

By T. J. MALONE

**I**F YOU ask a Sidney, Nebraska, man why his city for a second time has taken over the electric generating plant there, after a fifteen year spell of other control, he's likely to tell you: "It's in the air. Our cornhuskers and wheatshuckers are built that way. They like to do things for themselves, to run their own affairs."

In 1915 Sidney, now a city of 4,500 but then of about 2,500, bought a privately owned steam-powered generating plant which had served the community for nine years—its first service of electricity. The city, after operating the plant for fourteen years, sold it to the Western Power Service Co., a private concern. In 1942 the latter sold the plant, then became part diesel, to consumers Public Power District, a sub-division of the state of Nebraska. In May 1944 the city bought the plant and certain distribution accessories in the Sidney area from "Consumers."

Without a cent down, with nothing but credit, the city acquired the plant from "Consumers" by means of an issue of \$740,000 in revenue bonds. It sold additional revenue bonds to the amount of \$145,000 for installing a second Fairbanks-More diesel engine in November 1947, an 8-cylinder 1600-hp. with 1125-kilowatt alternator capacity. The other F-M engine, of 1200-hp., had been running since 1931.

Against that total debt of \$885,000 the city had paid \$345,000 by April 30, 1948, end of the latest operation year. Earnings of the plant contributed \$135,000 of that payoff. Where had the other \$219,000 come from? From dropping the outer-fringe interests. But let's leave that until later.

The generating equipment taken over from "Consumers" comprised four steam engines of combined 915-hp. and 560-kilowatt rated generator capacity, the 1200-hp. Fairbanks-Morse diesel engine of 833-kw. alternator capacity and a 4-cylinder Worthington diesel of 480-hp. and 329.6-kw. (Boiler capacity limited the actual steam units potential to 440-kw.)

Sale and removal of three of the steam engines, as of May 1, 1947, left a 240-hp. Chuse steam engine of 140-kw. rated capacity. All three boilers, coal fired, were retained and kept available for heat service. The service went to a number of downtown business organizations and several public buildings of the city.

In the first two years of renewed municipal ownership, an REA cooperative supplied more than half the total volume of energy recorded at the plant switchboard. Diesels and steam fell that far short of meeting the load alone.

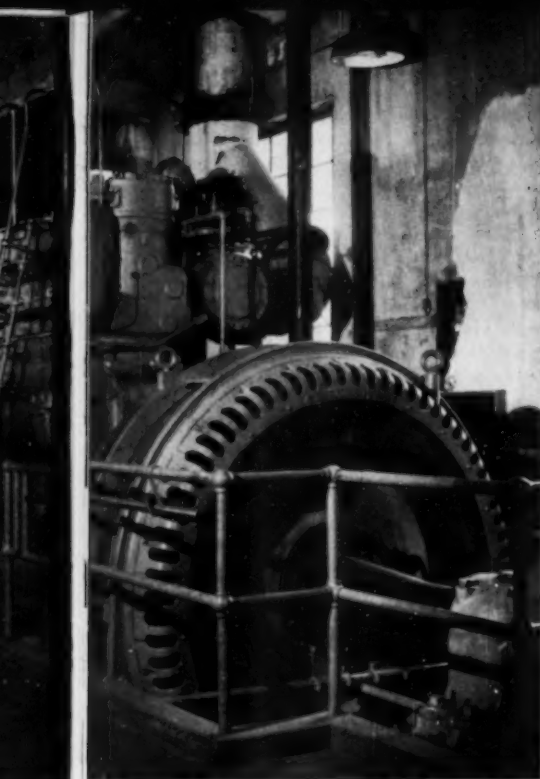
In September, 1946, the city sold all its outside

distribution holdings to the cooperative. The sale included an agreement whereby the city engaged to use from the cooperative a power load from 350 to 1,000 kilowatts up to September, 1949. Thus after November, 1947, the gross power rating of the plant stood at 3,427.6 kilowatts.

The story of performance from the three-component pool of energy—diesel, steam, REA—is told in the following table. In it "D" stands for diesel, "S" for steam, "R" for REA and "T" for total. While average at-switchboard costs per kilowatt hour vary with the three sources of energy, average per KWH cost delivered to consumer meters and average per KWH revenue are computed from a common pool of diesel, steam and REA.

Volume of energy at the switchboard in 1947-48, 7,838,408 kilowatt hours, compared with volumes of the two years just before, indicates that increased municipal use has more than made up for the dropping of service to outside distribution customers. Decline in use of REA energy reflects a municipal policy of keeping close to the 350-kw. minimum requirement.

Total diesel generation in the first four months of the operation year, 1948-49, May-August inclusive, was 2,787,690 KWH. Output per gallon averaged 12.13 KWH. Total steam generated vol-



ume at switchboard for the period was 820 KWH.

The 17-year-old 1200-hp. diesel was shut down through February and March of 1948 for overhaul and installation of rebored cylinders, new pistons, new heads. This engine had averaged 10.86 KWH a gallon in January, that year; in the following August it averaged 11.75 KWH.

Beginning with the first month of operation of the new 1600-hp. diesel, December, 1947, that engine averaged monthly for nine straight months approximately 12.5 KWH to a gallon. It did 13.1 in one of them.

Of the total energy volume distributed in 1947-48, 6,952,829 KWH, residential lighting used nearly one half and commercial light was next with a more than one-fifth.

Line loss, 661,679 KWH, was 8.44 per cent of gross generation.

There are no free services in Sidney. All energy to municipal departments is billed and paid for. On April 30, 1948, there were 2,020 meters in service, 774 electric stoves and 518 electric water heaters.

Per capita domestic (residential) consumption for the operation year 1947-48 was 3,018 KWH and the per KWH cost, 2,871 cents. This compared with the national average (for calendar year 1947) of 1,435 KWH and 3.06 cents, respectively.

On April 30, 1948, the monthly charge to residential customers was \$1.00 for the first 14 KWH or less, 5.5 cents for the next 36 KWH, 3 cents for the next 100 KWH and 2 cents for excess. Minimum is \$1.00 a month.

Operation year	Gross KWH volume at switchboard	Av. KWH cost at switchboard	Av. KWH cost del. based on gross volume Cents	Av. KWH revenue based on gross volume Cents	Number KWH per gal. of fuel oil	Peak load, KW	Rated KW capy (sea level)
5/26/44							
4/30/45	(D) 3,388,790	.789			11.80		
	(S) 436,120	6.325					
	(R) 4,265,084	.988					
1945-46	(T) 8,089,994	1.192	1.365	2.578		1,370	2722.6
	(D) 3,155,070	.927			11.46		
	(S) 240,560	10.21					
	(R) 4,098,254	1.045					
1946-47	(T) 7,493,884	1.289	1.482	4.026		1,342	2722.6
**	(D) 4,082,950	1.234			11.58		
	(S) 534,515	4.263					
	(R) 2,947,842	1.267					
1947-48	(T) 7,565,307	1.461	1.648	2.924		1,520	2722.6
***	(D) 6,544,130	1.358			11.52		
	(S) 40,490	10.9					
	(R) 1,243,788	1.773	1.999	2.871		1,740	3427.6
	(T) 7,838,408	1.773					

\* Figures for diesel and steam are generation costs; those for REA are as received at board.

\*\* Outside service dropped in September, 1946.

\*\*\* Three steam engines removed May 1, 1947.

Average revenue per KWH is figured from net energy sales.

Rated KW capacity includes 100-kw. from REA. The elevation of Sidney is 4,091 feet.

For general lighting service, available for commercial power in urban-rate areas, the charge was \$1.00 for the first 16 KWH, 5 cents for the next 235 KWH, 4 cents for the next 250 KWH, 3 cents for the next 2,500 KWH and 2.5 cents for excess. Minimum bill is \$1.00 plus \$1.00 per horsepower of incidental load connected in excess of 3-hp.

Effective May 1, 1948, a fuel-clause adjustment was made applying to all rates and classifications which added one mill to each kilowatt hour sold for each one cent of increase in the fuel-oil price above 5.78 cents a gallon. That was the price paid when the city took over in 1944. In October, 1948, the price in Sidney was 10.92 cents, which added five mills per KWH to the customer's bill.

The city of Sidney has a board of public works that directs light, power, heat, water and sewer departments. Its members: Dr. R. E. Roche, chairman, N. W. Ladegard, Guy V. Doran, A. D. Greenlee and E. L. Uptegrove. Vern Livingston is manager of public utilities. A. R. Mall is chief engineer at the electric plant.

Let's go back to retiring the plant debt and where that \$210,000 payment had come from.

Before the city made the deal with "Consumers," the latter had owned and operated the electric generating and distribution system serving the community, the distribution systems in four small neighboring towns, rural lines in the Sidney and four-town areas, and the steam in Sidney.

The city bought all the foregoing property from "Consumers" on May 26, 1944. To reduce the holdings to municipal size, the city sold to the REA cooperative, in September, 1946, forty-seven miles of rural lines and the four small-town distributing systems. Proceeds of the sale, \$161,000, were applied to the retirement of debt.

With the sale to REA, the city began dropping (piecemeal) service to an ordnance depot maintained by the federal government outside Sidney. "Consumers" had served the depot with part of its electric load. But Santa Claus was in the offing. Through the purchase from "Consumer," the city came in for \$46,000 from the government as "contributions in aid of construction" in connection with that depot. The \$46,000 was used to take up

more revenue bonds. REA's \$161,000 and Uncle Sam's \$46,000 made up the \$210,000.

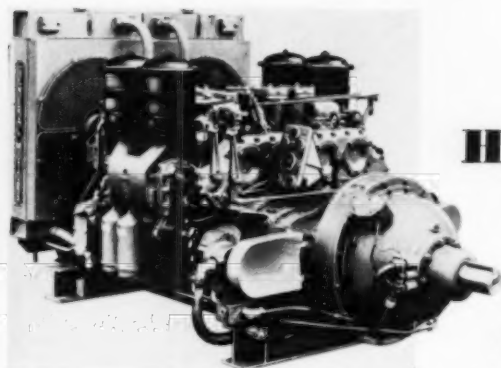
Sidneyites believe that thier investment in running their own affairs is paying off well.



Favorite of the plant operators is this 1200 hp. F-M diesel which has been running since 1931.

Gardner-Denver, left, and Worthington, right, air compressors, both motor driven.





## NEW HIGH OUTPUT TORQUE CONVERTER

**T**HE new General Motors Torque Converter, now in production at the Allison Division of General Motors, is being manufactured for use with Detroit Diesel Engine Division Series 71 engines as a complete, self-contained engine-converter unit in a number of vehicle, industrial, and oil-field applications throughout the country.

The converter is of the "rotating housing" type and consists of the following: the pump, the turbine, and two stators (Figure 1). The outer converter housing which encloses the rotating parts of the converter, attaches to the No. 1 SAE flywheel housing of the engine in the usual manner. In addition to providing support for the outer bearing, it also provides the inlet and outlet connections for the fluid to circulate through the converter and supports the "ground sleeve" on which the two overrunning clutches are operated.

The overrunning clutch assembly, the hub and the stator casting are riveted together to form each stator assembly. These assemblies, in turn, are held on the "ground sleeve" by snaprings and washers which also carry the end thrust of the stators. The overrunning clutch in each of the stator assemblies consists of an outer race, rollers, springs, and spring cups (see insert Figure 1). Tickler springs push the rollers into engagement between the cam surface of the outer race and the "ground sleeve." The rollers thus lock the stators against movement in one direction. When the stators are "free wheeling," centrifugal force compresses the spring to release the rollers for reduction of friction.

Two drive shaft arrangements are available: a short shaft for direct drive in vehicle applications and a longer heavy-duty shaft for general industrial applications. The shaft is mounted with a pilot bearing in the flywheel and a heavy-duty anti-friction outer bearing in a retainer attached to the housing. The converter pump housing is bolted to the flywheel which forms the back cover for the rotating converter assembly. This assembly is supported on the crankshaft by a flexplate which consists of a hub and a number of laminated steel disks. The flexplate isolates the converter thrust from the crankshaft and compensates for variation in the engine and converter dimen-

sions as well as axial variations due to misalignment in assembly or excess over hung loads.

The General Motors Torque Converter can be operated with any heavy-duty SAE No. 10 viscosity oil. Circulation of the oil through the converter and the cooler is obtained by means of a small charging pump located on the flywheel end of the engine. A charging pressure of 60-90 lbs. per sq. in. is maintained in order to circulate sufficient oil for adequate cooling and to eliminate any possibility of cavitation.

The cooling provided to take care of the normal operating range of the converter is combined with the cooling system of the engine. The oil-to-water heat exchanger on the side of the engine, normally used to cool the engine lubricating oil, has been enlarged to house a second oil cooler element to take care of the converter.

Operation of the torque converter is fully automatic and requires no attention from the operator. Because the angles of the blades are generally fixed, optimum performance of a fluid coupling or converter can be obtained under only one set of conditions of input speed vs. output speed. At speeds above or below this optimum point, there is a drop in efficiency. This normal drop in performance is compensated for by the free-wheeling of the stators in the General Motors Converter which in effect changes the angularity of the blades and gives three separate blade combinations or blade angles. Typical full throttle performance of a power unit is shown in Figure 3.

Since the shift from one combination to another is a gradual and continuous process, it is imperceptible to the operator. The turbine blades absorb energy from the oil in the usual manner, meanwhile directing it toward the center of the wheel. The oil leaves the turbine with high velocity in a direction opposite to the rotation of the elements. The continuous curved blades of the two stationary stators redirect the oil with little loss of energy so that all residual energy is utilized by the pump. Thus, the converter pump virtually serves as a second stage turbine.

With an increase in the speed of the turbine rela-

tive to the pump there results a decrease in relative velocity of the oil leaving the turbine. With sufficient decrease in relative velocity of the oil leaving the turbine the oil no longer acts upon concave or front sides of the stator blades but is thrown against the back side of the blades of the

first stator.

The force of the oil against the back side of the stator blades causes the first stator to rotate in unison with the turbine. With only one stator grounded, the entire unit performs as a different converter, having different characteristics as previously noted in Figure 3. With further increase in relative speed of turbine to pump, the second stator is caused to free-wheel in a similar manner. From there on through the speed range of the prime mover, the unit operates as a fluid coupling.

The capacity of a converter once established by test is normally shown on an absorption curve (see Figure 4). To match a converter to an engine, the engine torque curve is drawn through this curve to determine engine rpm and input torque corresponding to different speed ratios. By correctly matching the converter to the engine a nearly constant speed of the engine is obtained regardless of the speed of the output shaft and also regardless of whether the load requires operation in the converter or the coupling range. With the engine operating at a nearly constant optimum speed the maximum horsepower input is assured over the entire range of converter and fluid coupling operation.

Converter performance is usually expressed in efficiency plotted against speed ratio as shown in Figure 5. Torque multiplication, commonly called the torque ratio, also is plotted on the same basis. Maximum torque ratio is obtained with the output shaft stalled. The engine speed at this point is called the "stall speed."

The horsepower available at the output shaft at various speeds is not only a function of the converter efficiency but depends to a considerable extent upon proper matching of the converter to the engine. The General Motors Converter is designed for the Series 71 diesel engines and therefore delivers the maximum power obtainable from the combination at the output shaft. In order to deliver maximum output horsepower, it is important to maintain high engine speed and thus high horsepower input from the engine over the entire range. The fluid coupling at the top range provides high efficiency at top operating speeds. This is particularly effective at part throttle and light load operation since under these conditions the General Motors Converter cycles through the converter stage very rapidly. It changes its fluid coupling range at low output shaft speed and continues to operate through the balance of the speed range as a fluid coupling, at high efficiency, as shown by the part throttle curves and constant efficiency lines in Figure 6.

In addition to the ability of making maximum horsepower available at the output shaft, the converter furthermore makes it impossible to operate the engine at full load except in the upper 25% of its speed range. This protects the engine from

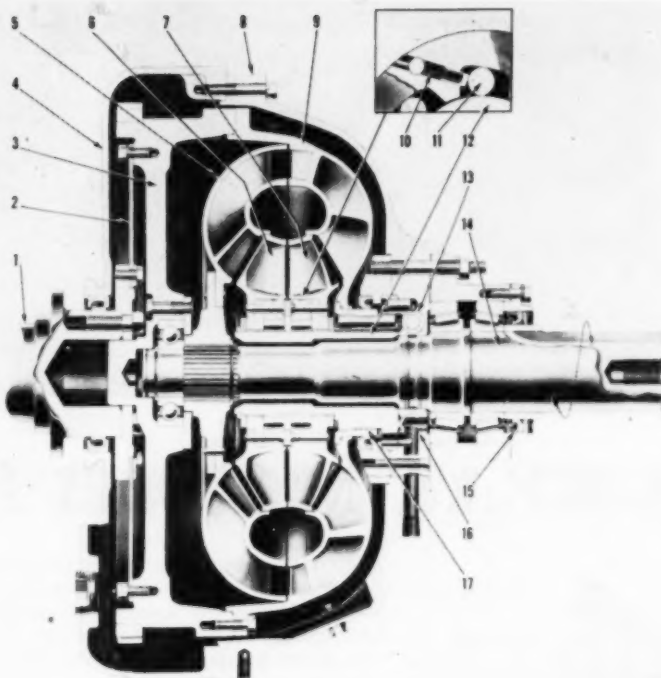


Fig. 1—Cutaway view of new General Motors Torque Converter.

- |                      |   |
|----------------------|---|
| 1. Engine Crankshaft | 9. Converter Pump                           |
| 2. Flexplate         | 10. Roller Spring                           |
| 3. Flywheel Assembly | 11. Freewheel Roller                        |
| 4. Flywheel Housing  | 12. Converter Ground Sleeve                 |
| 5. Converter Turbine | 13. Oil Supply Inlet (New)                  |
| 6. First Stator      | 14. Converter Output Shaft                  |
| 7. Second Stator     | 15. Outer Lip Type Seal                     |
| 8. Converter Housing | 16. Outlet to Oil Supply Tank               |
|                      | 17. Piston Ring Type High-Pressure Oil Seal |

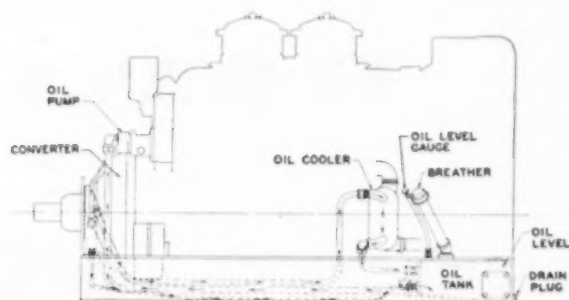


Fig. 2. Torque Converter Oil Supply system.

lugging at low speeds and avoids excess fuel consumption that occurs when an engine is pulled down below its most efficient range of operation. The engine speed and torque characteristics (Figure 7) shows that they are nearly constant through the entire speed range of the unit. At full throttle as shown, the engine speed drops only slightly below 1600 rpm.

The General Motors Torque Converter can be used for push starting of the engine. Adequate cranking speed of the engine is obtained at 600-800 rpm. of the output shaft, the exact speed depending upon the engine temperature and the amount of oil in the converter.

Another outstanding feature of the converter is that its performance characteristics do not change with use as there is no wear of the moving parts. The stall-speed of the engine should always remain the same. Thus the output of the engine can be conveniently checked in the field by opening the throttle wide and determining the engine speed with brakes applied.

The converter tends to rotate at near engine speed at all times and a certain amount of drag torque prevails even at idling speeds. Therefore, in order to shift gears behind the converter, a cut-off clutch must be provided.

FIG. 4 TORQUE ABSORPTION CHARACTERISTICS

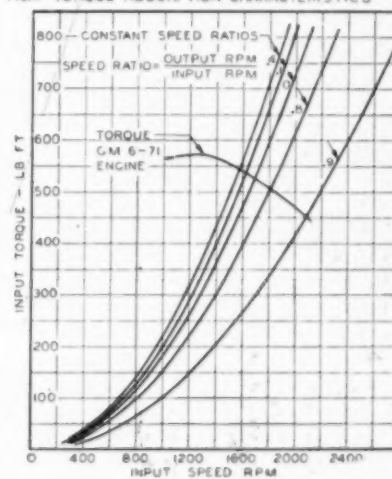


FIG. 3 FULL THROTTLE PERFORMANCE ENGINE AND CONVERTER

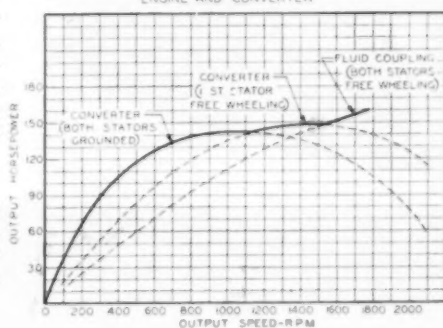


FIG. 5 CONVERTER PERFORMANCE

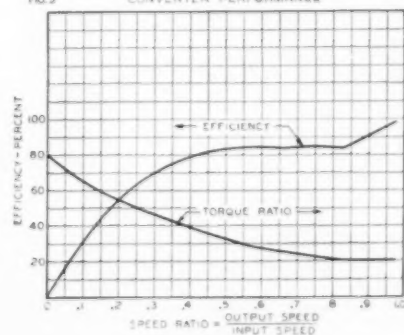


FIG. 6 GENERAL MOTORS CONVERTER POWER UNIT 8 CYLINDER 71 SERIES ENGINE TORQUE CHARACTERISTICS

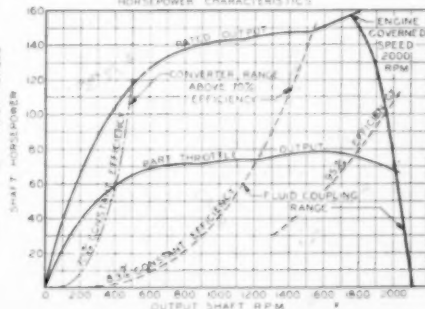
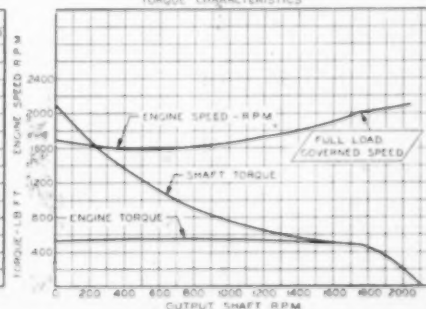


FIG. 7 GENERAL MOTORS CONVERTER POWER UNIT 8 CYLINDER 71 SERIES ENGINE TORQUE CHARACTERISTICS





## IT WAS A GREAT MOTOR BOAT



AMONG the major attractions of the 1949 Motor Boat Show here in New York, which by the way was one of the largest Motor Boat Shows ever held, were the engine exhibits which, aside from the outboard and smaller inboard classifications, were largely dominated by diesels. And we might say that the importance of this great national show was highlighted by the personalities who took the time away from their busy desks to put in an appearance at their exhibits.

At the spectacular Caterpillar exhibit, the center of interest was the new 12 cyl. V-type diesel featuring an air-starting motor and supercharging, with Falk gear and six auxiliary power take-offs—a 400 hp. engine, 1200 rpm., for continuous service. This is the largest engine in the Caterpillar line, and in chatting with Howard S. Eberhard, Vice President in charge of engineering, we learned that the engine will go into production this year for both marine and stationary service. The Caterpillar exhibit was handled by the Sales Development Division of the General Sales Department, with C. E. Jones of that department



# BOAT SHOW

in charge and those in attendance with him were Ralph Bradley, special representative, B. R. Shelley, special representative, W. C. Burgy, marine specialist, Dale Richardson and Robert Lamoureux of the Engineering Sales Department. Fred V. Jacobs of the Caterpillar Advertising Department was on hand and W. L. H. Doyle, engineer in the Research Department, also dropped in on his way to Detroit for the S.A.E. annual meeting.

In charge of the Buda exhibit, featuring the new Buda orange color on all models of their extensive line of diesels, was Russell Hughes. In attendance at the exhibit were H. H. Cohenour of the Advertising and Public Relations Department, L. F. Shoemaker, sales manager, and T. R. Kelly, special representative, all from the home office. Featured in the Buda exhibit were two new diesel engines, a new heavy-duty supercharged 8 cyl. model rated at 400 hp., equipped with American Bosch injection, B-W supercharger, Pierce governor, Fram fuel filter, DeLuxe lube filter, Ross Heat exchanger, Delco-Remy generator and start-

ing motor, and Western Gear reverse and reduction gear and power take-off. The other unit of special interest was a single cylinder 32 volt diesel-electric marine generator set, also displayed in 2 and 4 cylinder models. These are complete self-contained units for generating or power purposes.

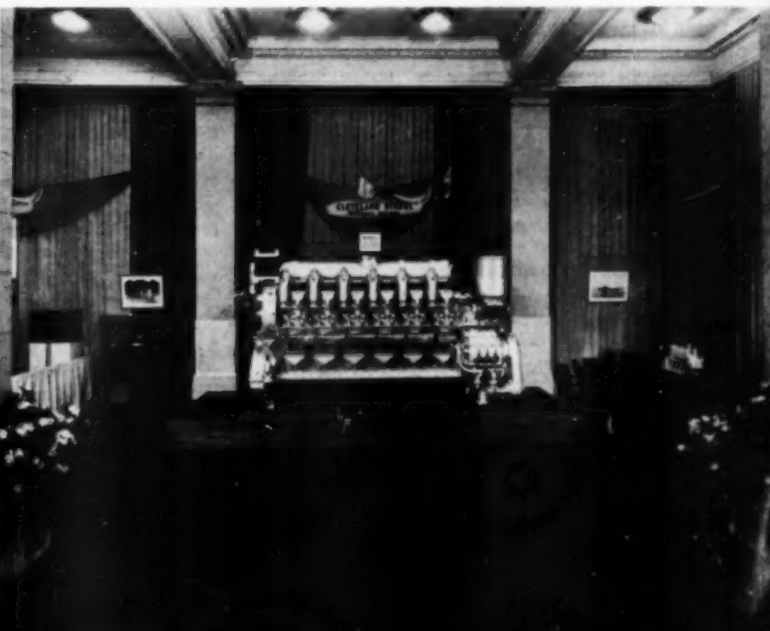
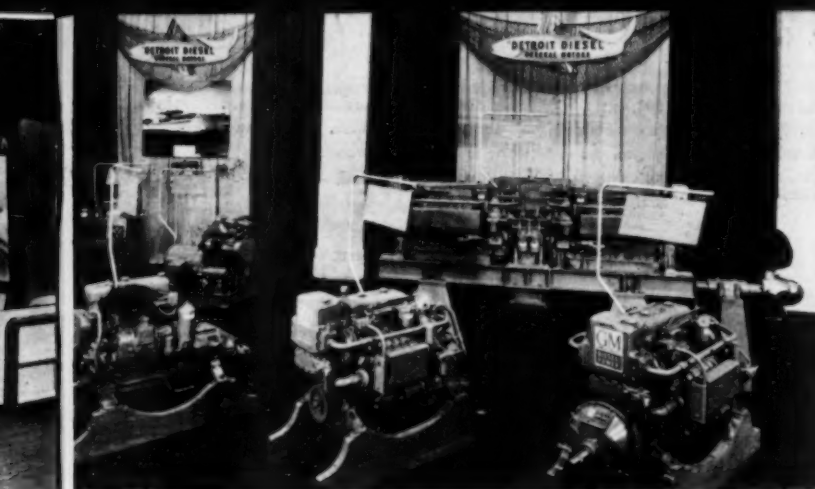
The Detroit Diesel Engine Division of General Motors, an exceptionally large exhibit in charge of the New York distributor organization, Griffin Equipment Company, featured a new version of the multiple engine arrangement, a 400 hp. twin 6-71 Series diesel unit in tandem. The two engines were mounted back to back on a common channel beam base, driving a common "bull" gear through a pinion splined to the drive shaft. Each unit is equipped with General Motors hydraulically operated reverse gears which are controlled in unison by a common selector valve. Also shown in the Detroit Diesel Division exhibit were a pair of 6-71 diesels matched for installation in twin screw vessels. One of the main attractions of this exhibit was the famous chromium plated cut-away of a basic Series 71 diesel in operation, also a static cut-away model of a 6 cyl. marine engine with hydraulic reverse gear. A number of packaged diesel generator sets ranging from 20 to 60 kw. were displayed. Various members of the

Detroit Diesel staff, including V. C. Genn, Sales Manager, J. E. Duncan and J. W. Brown, Advertising Manager, were in attendance at the exhibit during the week.

We chatted with R. E. Huthsteiner, Vice President and General Manager of Cummins Engine Company, at the Cummins exhibit where one of the very interesting features was a cut-away display of the Cummins fuel injection pump, which is actuated to simulate the complete operating cycle. Backing up this large and interesting exhibit were an electrically lighted map of the United States showing the location of each Cummins dealer and illuminated globes showing world-wide distribution. H. P. Sharp, manager of Sales Development, was in early in the week to get the exhibit going and went on to Chicago to perform a similar function at another show. Also featured in the Cummins exhibit were LM and NHBS heavy-duty diesels, equipped with water-cooled exhaust manifolds, variable speed hydraulic governors. Twin Disc power take-offs.

Perennially attractive was the big silvered version of the Model 12-278-A engine of the Cleveland Diesel Engine Division of General Motors, widely known for the many installations in ocean going

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tugs, river boats, lake ore boats and a wide variety of naval installations. In charge of this exhibit was Tom Hughes, general sales manager, and in attendance were representatives from Cleveland, New Orleans, New London, Boston and Washington. George W. Codrington, General Motors Vice President and head of the Cleveland Diesel Engine Division, also President of the National Association of Engine and Boat Manufacturers, paid his respects early in the week and went on to other pressing duties. Featured in this exhibit was the famous scale model of a Cleveland Diesel 16-278-A diesel engine with Allis-Chalmers 1200 kw. D.C. generator, presented by William Francis Gibbs to George W. Codrington in appreciation of Mr. Codrington's enthusiasm, cooperation and assistance in the promotion of the diesel-electric drive for vessels.

Atlas featured a 6 cyl. diesel model of 6¼ in. bore, 8¼ in. stroke, rated 135 hp. at 900 rpm. with built-in Twin Disc reverse reduction gear, American Bosch fuel injection and Alnor pyrometer. In charge of the Atlas exhibit was K. H. Nilsson of the Atlas New York office, assisted by M. A. Tenney also of the eastern office. Announced at this time but not shown was the new Atlas Series KM-668 9 in. x 10½ in. diesel engine, to be offered in 4, 5, 6 and 8 cyl. versions, rated from 150 hp. to 570 hp. at speeds ranging from 600 to 750 rpm., for both marine and stationary application. These new engines are featuring Scintilla fuel injection equipment.

Nordberg Manufacturing was on hand featuring its 4 cycle turbocharged 6 cyl. marine diesel with single lever control system for flexible maneuverability and interesting designed features including inspection covers on both sides of the crankcase, aluminum valve gear covers and quick-opening air-starting valves which are operated by pilot air from a distributor gear driven by the crankshaft. Also featured in the Nordberg exhibit were four gasoline marine engine models ranging from 230 to 340 cu. in. displacement.

Gray Marine was on hand with its perennially large exhibit including 21 of its 26 marine engine models. Three diesel models were displayed having piston displacements of 157, 260 and 572 cu. in., ranging from 30 to 150 hp. and featuring the "cushioned power" combustion chamber. Also shown were two 4 cyl. diesel marine models. Harold Bright, Vice President and sales manager, and R. H. Mitten, Director of advertising and publicity, were in attendance at the Gray exhibit.

Kermath Manufacturing Company was on hand as usual displaying diesel marine conversion units of 2, 4 and 6 cyl. models, ranging from 27 to 200 hp. The Kermath Model 6-895 diesel marine unit features this year a combination reverse reduction gear hydraulically actuated, the unit being rated at 170 hp., 1600 rpm., having twin electric starting motors. Thomas Grula, sales manager, and Oliver Fraser, general manager, were present at the Kermath exhibit.

Lathrop Engine Company, builders of heavy-duty marine engines for fifty years, included in its ex-

hibit two diesel Models D-50 and D-H 200, extensively used in commercial fishing vessels on both coasts. The 4 cyl. diesel model has a piston displacement of 665 cu. in. and weighs approximately 3,000 pounds. The Lathrop 6 cyl. diesel model is rated 187 hp. for continuous duty at 1600 rpm. Among those present at the Lathrop exhibit were Walter F. Lathrop, President, E. A. Harrison, Treasurer, Edward R. Wells, factory representative, Howard E. Fuller, purchasing and assistant treasurer, and John Verrier of Verrier & Eddy, distributors for Lathrop.

Seen in the D. W. Onan exhibit was its new 10,000 watt diesel-electric plant incorporating a water-cooled version of the Onan diesel engine. Onan alternating current diesel generating sets range from 10,000 to 35,000 watts in 115 or 230 volts and various other standard voltages. Onan also offers diesel generating units for direct current in 115 or 230 volts from 10,000 to 15,000 watts. John L. Potter of the Marine Sales Division and Hiram Haskell, sales manager, were in attendance at the Onan exhibit.

An old time exhibitor at the Motor Boat Show, having appeared regularly since 1905, was the Palmer Bros. Engines, Inc. featuring in its exhibit the low speed heavy-duty Palmer engine that has for many years seen service in fishing vessels and work boats along Long Island Sound and the east coast. The Palmer line of engines ranges from 2 to 120 hp. R. C. Bolling, President, was among those in attendance at their usual corner exhibit.

Making its debut at the show was a new Flagship light six diesel engine which was exhibited by the Owens Yacht Company. It is a 4 cycle, 249 cu. in. displacement engine featuring complete marine accessories including cross-flow heat exchanger with thermostatic control in the cooling system, the engine being arranged for either direct drive or through reduction gears. For direct drive it is rated 70 hp. and with reduction gear 95 hp. This is a marine conversion based on the Hercules diesel engine, featuring Delco-Remy generator and starter, American Bosch fuel injection equipment and Purolator filter. In charge of the exhibit at the annual motor boat show was Meryl E. Miller, chief engineer of the Flagship Division of Owens Yacht Company.

On hand with an impressive display of both air and water-cooled power and generating units was United States Motors Corporation, featuring smaller models up to 10 hp. and heavy-duty models in 1 and 2 cyl. versions, 5 and 10 hp. respectively, arranged for direct drive or built-in reverse gear. Electric generating plants were displayed by United States Motors including a series ranging from 300 watt 6 volt, to 1500 watt 32 volt charging units. In charge of the United States Motors exhibit was W. J. Clark, sales manager from the home office, who specially called our attention to the combination marine diesel auxiliary unit comprised of fire and bilge pumps, Quincy compressor and a 10 kw. generator, all mounted on a common sub-base, making up a very compact and complete unit. Also displayed was a 10 kw. marine auxiliary diesel generating unit.

The display was particularly attractive in that all units displayed were finished with glistening white enamel and chromium plate.

Appearing for the first time in the United States was a small British made Coventry diesel. It is a lightweight high-speed, water-cooled unit in two models, one of which ranges from 5 to 7 hp., the other from 7 to 9 hp. The engine is offered as a sailing auxiliary unit and for small fishing boats, utility and work boats. The small model weighs only 220 pounds and the larger 240 pounds. The United States distributors for the British Coventry diesel engine, Engineering and Industrial Exports, Ltd., sponsored the exhibit. Mr. John H. Donald, Manager, was in charge of the exhibit.

In talking with F. (Nick) H. Carter, assistant sales manager, and Alex Campbell, regional sales manager, of Harrison Radiator Division, General Motors Corporation, we were told that Harrison has a new plate type air cooler. These coolers are designed to improve the lubrication and minimize wear in moving parts whether installed on gasoline or diesel marine engines. Nick Carter emphasized, as he always does, the fact that the new Harrison line insures greater strength through their all brazed construction, lighter weight and complete range of sizes to cool all types of engine installations. Other members of the Harrison organization attending the show were R. Eberhardt, sales manager, F. Vanhorn, H. W. Lloyd and H. Greene, of the sales engineering staff.

One of the new products drawing a lot of attention at the show was the Fluid Heat marine heater, exhibited by the Fluid Heat Division of Anchor Produces, Inc. Captain James Price and Thomas E. Carson, Jr., sales representatives of the Automotive and Marine Division, told us that this unique unit is a dual fuel proposition and burns either kerosene or gasoline with complete interchangeability. They went on to say that a Fluid Heat marine heater is capable of maintaining comfortable temperatures in from one to three compartments of any boat and has an appreciable effect on lengthening the cruising season in temperate climates.

Twin Disc Clutch Company was showing for the first time their brand new Model MGH 175 Reverse and Reduction Gear, rated at 105-175 hp. It is equipped with Model 17½" hydraulic couplings, as well as hydraulic actuated forward and reverse clutches giving finger tip control through dual type sliding valve. Auxiliary power take-off is located at rear of housing for driving auxiliary drives capable of transmitting up to full engine horsepower. Power take-off runs continuously and is driven through hydraulic coupling providing cushioned flexible drive. Both John Batten, President, as well as N. F. Adamson, Vice President, in charge of sales and engineering, were here for the show, in addition to E. H. Bennett, eastern district sales manager.

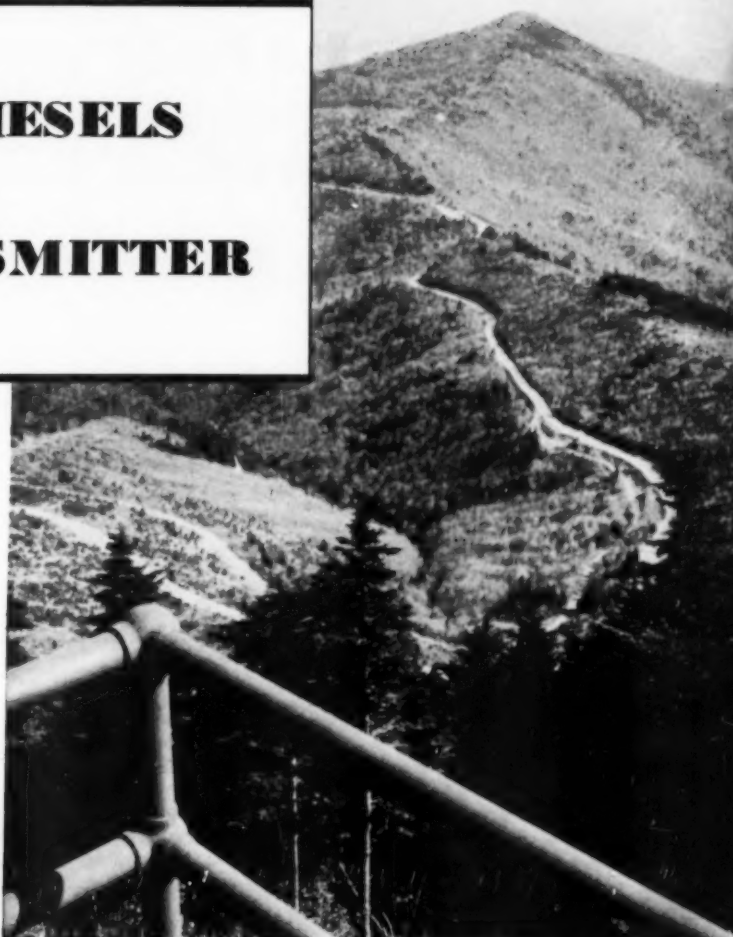
C.O.TWO introduced two new features to their display booth for cruising in pleasure or com-

... and now please turn to page 55 ...

# MOUNTAIN-TOP DIESELS FOR RADIO TRANSMITTER



View of transmission facilities of station WMIT at the top of Clingman's Peak.



View from mountain top showing road to Marion, N. C.

**D**IESELS play an unusually vital role in the lives of 10 North Carolinians who compose a tiny, isolated community located atop a mountain 30 miles from the nearest town of Marion, N. C.

These persons derive their livelihood from the diesel-generated electric power which transmits FM programs from Radio Station WMIT. And their existence on the remote peak is made possible, and comfortable, by the same power, the generated current providing for heating, lighting, and cooking. Access to the outside world also is partially dependent on a diesel tractor used in road maintenance and snow clearance. A total of five diesel engines belong to the WMIT property. All are Caterpillars. Three of them are of 110 hp., connected to 74 kw. General Electric generators. Each has operated more than 7,000 hours with practically no repairs where parts are affected by lubrication, according to J. Luther McFarland, transmitter supervisor.

A fourth engine, a 25 hp. diesel powering a 15 kw. generator, has operated 20,684 hrs. without an overhaul. Mr. McFarland figures that if this engine were powering an automobile, at 35 miles per hour it would have traveled 723,940 miles—

approximately 29 trips around the earth. The fifth diesel is in the station's Caterpillar tractor. Utilizing a Trailblazer attachment, this rig is used to maintain 1.1 mile of private road which connects the station with N. C. Route 128. When the occasion demands, it also is used for snow removal. Before the state paved the main highway, the tractor frequently cleared the road of snow most of the way to Marion.

Mr. McFarland gives a great amount of credit for the outstanding performance of the five diesels to the careful lubrication and maintenance program worked out in connection with Ray Taylor of Greensboro. Mr. Taylor is the representative in the Carolinas and Virginia for the D-A Lubricant Company, Inc., Indianapolis.

"Our preventive maintenance program is the essence of simplicity, but it sure works wonders," Mr. McFarland says. "Our diesels are thoroughly examined each day for little operational defects such as loose belts, leaks, and proper levels of water and lubricating oil. Temperatures are checked every half hour. Whenever the engines begin heating above normal, water systems are flushed and cleaned

"After every 200 hours of operation, the crankcase is flushed, cleaned, and refilled with D-A diesel oil. Filters are replaced and air screens are cleaned. The crankcase of our engines have had nothing in them but D-A diesel oil, density SAE 20."

The diesel tractor has an equally fine maintenance record. D-A diesel oil is used in the crankcase, and grease fittings are lubricated with D-A Gun Grease, Type D, medium density.

WMIT is the first and oldest FM radio station in the Southeast. It was built in 1941-42 by Gordon Gray, owner and publisher of the Winston-Salem *Journal-Sentinel*. Broadcasting began June 11, 1942 on 44.1 megacycles.

Mr. McFarland believes the top of WMIT's antenna to be the highest point in the United States east of the Mississippi River. The transmitting station is on Clingman's Peak, three miles from Mt. Mitchell. At 6,684 ft. above sea level, Mt. Mitchell is the highest natural point in eastern United States. The WMIT antenna is 54 ft. higher. Facilities include the Clingman Peak transmitter station, and studios in Charlotte, N. C.

# TREE FARMING WITH DIESELS

By CHARLES F. A. MANN

## Historic 200,000-Acre St. Paul & Tacoma Lumber Company's Mt. Rainier Tree Farm Converts From Steam Railroad-Cut-and-Scream To Diesel-Perpetual-Harvest Operation



St. Paul & Tacoma Lumber Company tree planting on the foothills of Mt. Rainier.

**H**IGH on the slopes of the rugged Cascade Mountain foothills, nestling close to the base of Mount Rainier, Washington, is a maze of deep valleys, sharp forested hills, broad inter-connecting passes between the various watersheds—250,000 acres practically now integrated under one management—on which is written the entire history of forestry and old-time big scale lumbering in the Pacific Northwest.

Shortly before the 1880's began, the famous Griggs, Hewitt, Foster, Howarth and other Midwest lumber families, pulled up stakes and came West—to the fabulous Pacific Northwest, with their pockets full of hard cash, hopes fired by the fantastic vision of the world's mightiest commercial forest practically waiting to be had for a song. The Northern Pacific Railroad, with its fabulous, but then almost worthless Land Grant, was a property-busted Boomer Line, in search of quick traffic—in huge, steady volume, to give it revenue enough to keep going in a region that did not have sufficient population to operate a combined freight and passenger train once a month, let alone weekly or daily.

These lumber barons fresh from the Midwest, promptly set up the St. Paul & Tacoma Lumber Company—a sprawling plant built on piling in the tideflats of what was eventually to become Tacoma Harbor, and began operating in 1888, cutting trees four miles from the mill, hauling the logs from what is now Allenmoore Golf Course in the heart of Tacoma, by bull team, horses and chains, to the edge of the plateau upon which Tacoma is built, and chuting them into salt water, practically in front of the sawmill.

For sixty years, this "Largest of The Independents," has plugged away, through good years and lean, practically converting this peninsula forest into building sites, and sending its product round

the world and to long-established Atlantic Coast markets. Over 2,000,000 Japanese homes are said to have been built from lumber cut from the St. Paul mill's "Japanese Square"—giant Douglas Fir logs with their four slabs of bark cut off, to make a "Square" that fitted neatly into the hold of a ship—in the days when the price of lumber in America was so low that even Japan could afford to buy our lumber. The Luckenbach Steamship fortune is said largely to rest on the endless cargoes of St. Paul Tacoma lumber hauled through the Panama Canal prior to World War II. Not an Atlantic Coast city can be found without millions of feet of Douglas Fir structural lumber from this mill. . . . Nearly one third of New York's subway system, prior to 1935, was "Shored up" in construction, by St. Paul mill's timbers.

Gradually, as the timber receded, the company began following up the old main line of the Northern Pacific, toward the lush Mt. Rainier forests on the Puyallup & Carbon rivers, to a great permanent woods operation base set up near the town of Kapowsin, 30 miles from Tacoma, shortly after 1908.

Today, long after America thinks of the big woods as having been cut down, and big sawmilling moved to the Columbia River and western Oregon, St. Paul & Tacoma Lumber Company, after living on through the years of bull teams, steam high lead skidders, Paul Bunyan loggers, cheap timber, low wages and erratic markets, under the old time policies of the now dead and gone Management, emerges for its fourth transition. Swiftly, in a \$5,000,000 modernization, consolidation and tree farming program, "St. Paul Mill," after 60 long years emerges as operator of one of America's biggest single-unit tree farms, proudly remains as one of the biggest Northwest "Independents" and, under the judicious Management of the 3rd generation of the founding family, is swiftly con-

verting to a 100% motorized, logging, highway, dieselized operation, the like of which would raise the hair on the necks of its aristocratic, hard-shell founding fathers.

Profits from the war boom just passing, wisely used, enabled the pre-war company decision to cease operating on a cut-and-get-out policy, to be carried out swiftly in the past 4 years. A master plan to keep this entire magnificent operation, from tree-growing in the mountains, to effectual utilization of the last ounce of loose planer shavings, going forever, has been laid out. Right now, timber harvest plans for the year 1995 and on up to 2030 A.D. are all on the charts in Forester Norman Jacobsen's fireproof safe in the home office down on Tacoma Tideflats.

Mr. E. G. "Spike" Griggs, is President of the Company, and, with a few selected in-laws, the controlling ownership of the Founders projects this Company into the future a full century or more. "Spike," grandson of one of the founders, from St. Paul, is boss of the Forestry & Logging Department, tantamount to running the ore and coal mines, railroads and ships and blast furnaces part of a great steel operation. Only last Summer he shocked his ancestors by converting a roomy, old-time railroad bunkhouse, left over from tearing up half of their vast logging railroad, into a permanent woods retreat for himself and his mountaineering wife. Since he took over the reins from rather aristocratic, frosty 2nd generation Griggs forbears, the loggers and woods crew see more of their Company President in one week than they did his predecessor in ten years, and yoo hooing across the rocky hills and up the slopes of the logging "sides" to "Spike" is a favorite pastime for his famous crew of 3rd generation workers—sons and grandsons of the same workers who came West with the founders—which today move more



One of six Koehring Dumpsters, powered with G.M. 4-71 diesels, operating at 3500 ft. elevation in the High Cascade Range of Washington.

logs per man in one day than their logger fathers did in a week.

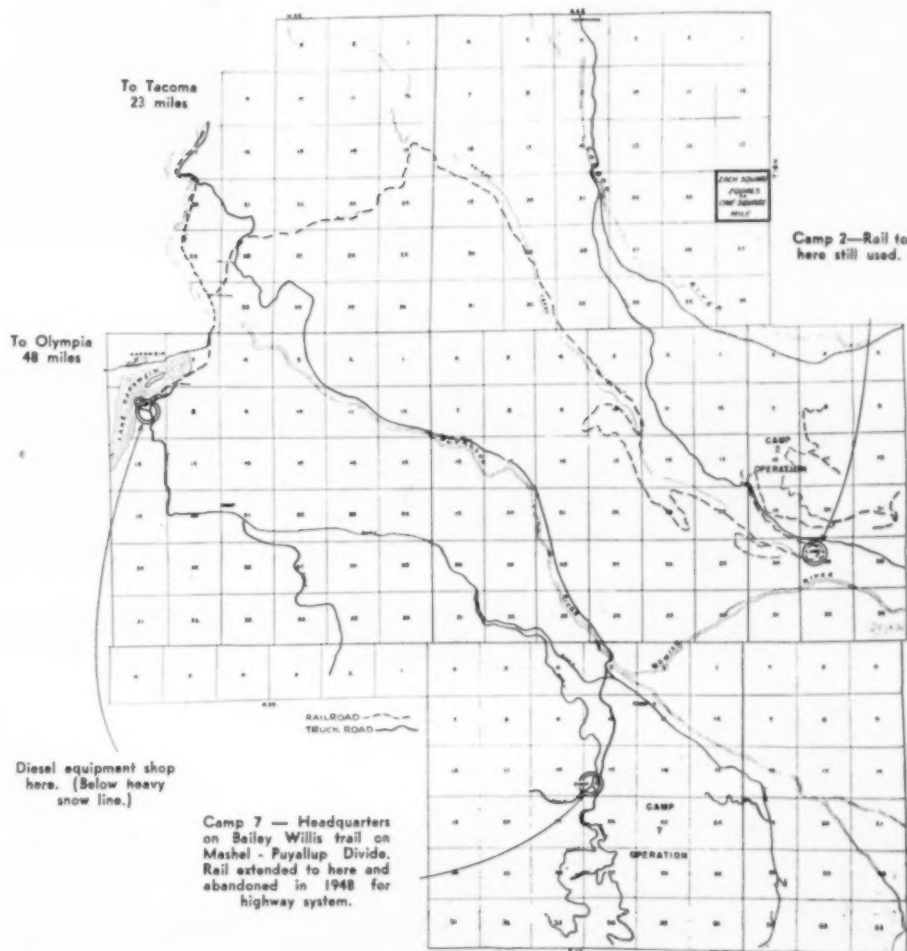
In the old, wide-open days of logging and sawmilling, timber was so plentiful as to keep the prices of the finished product so low, that only on periodical booms, due to wars, and occasional bursts of prosperity in various regions of the world, did anybody ever make much money. Hence the tendency for the whole industry to lag behind in modernizing and investing heavily in new systems and machinery.

Technology largely was in the hands of two classes of aloof, hardy men, one the loggers in the woods that delivered an endless stream of logs to the railroad flatcars, using back breaking labor, steam donkey engines and yarders; and the sawmill crew on tidewater that knew how to get lumber from the glorious center-pieces of 6 ft. Fir logs—but were careless, to say the least, about saving more than 40% of the tree.

The age of package power, and the motor vehicle age, just ahead of the diesel age, began converting the lumber industry's outlook, almost exactly the same time that the days of unlimited forests of cheap, big trees, ended. And with it ended the old diehard "cut-and-get-out" school of timber baron—mostly of heart failure and receiver's sales. That portion of the industry not willing to turn about and go forward on a permanent basis, either left by way of local mortuary or through the receiver's proceedings.

Gone forever was the old "Miners Outlook" in the lumber industry. The change in Management's outlook, brought in thousands of fresh new young executives, who had to break up a 200-year-old socially and economically unpopular set of logging and milling traditions, a husky labor force comprising the most rugged individualists

Map of the St. Paul & Tacoma Lumber Company Logging Operation and Tree Farm.



on the face of the earth—and proceed with inculcating a vision of a century ahead, into their organizations. And they called in the salesmen of new diesels, gas engines and machinery from all over the land, to let them visualize what a timber harvest might be like in the year 2025.

A long, deep breath by Management, with our hero, Mr. Spike Griggs as one of the Council of Twenty that helped keel-haul the sins of the past within the industry and clear the decks for tomorrow's stable, permanent, peaceful and prosperous non-transient Forest Products Communities—sparked the whole industry—particularly the jittery fire lumber industry of Western Oregon and Washington in fact the whole Northwest.

Taking advantage of the marvelous Washington State Reforestation Act, since copied by Oregon, which takes the onus of confiscation of logged-off lands by taxation off the lumber industry, the idea of perpetual tree farms was born in 1941—farms registered and taxed and policed as farms, to

grow crops of trees on an 80-120 year cycle, the same as corn is grown on an annual basis. Timberland assessed nominally at only \$1 per acre, with a crop tax of 12½% at harvest time, stopped the reverting of cutover land to the counties, for delinquent taxes. A man with 5 or 100,000 acres can join the Tree Farm Association and register his lands, and harvest his continuing crop of Christmas trees, fence posts, pulp wood, tail piling and poles, shingle bolts, sawlogs and, if he lives long enough, peeler logs for the plywood mills, same as Uncle Alf does the hay and milk on his farm.

The sawmills and wood-using industries can set up shop in permanent buildings, in permanent towns and become a permanent factor in community

prosperity—which they have done on a wholesale scale in the past 15 years. Gone is even the Portable Cookhouse in the logging camp—so is the old time logging camp—it is now located in the epicenter of the Company's vast tree farm, replete with diesel-generated lights and sewer systems, steam heat, showers and radios and paved streets.

St. Paul & Tacoma Lumber Company's vast Cascade Mountain domain is now a 200,000 acre registered tree farm. The millions spent in converting the entire operation from an old-fashioned, semi-portable, steam operated logging camp into a modern tree farm, the most of which was completed in 1948, the rest scheduled in 1950-51, gives the industry a model enterprise, lying almost within the shadow of metropolitan Seattle and Ta-

Right: Log Dump at Lake Kapowsin where Marion Loader, powered with 150 hp. Cummins diesel, transfers logs from truck to flatcar. Below: Same log dump, showing the Berger Donkey Loader powered with 165 hp. G.M. diesel.



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coma. The 5th generation of the Griggs Tribe expects to help harvest the tree-planings of 1940-1946-1958!

Yet this is only one Northwest tree farm—there are some 135 registered tree farms in the Douglas Fir Belt of Oregon and Washington, ranging from 10 acres to 500,000 acres under one management. A total exceeding 3,000,000 acres of Western Oregon and Western Washington is now included in this private industry forest program. Practically every large tree farm is tearing up its old logging railroad, and steam operated machinery, and converting to glorified truck and tractor logging, over privately built, heavy-duty logging highways, operating swiftly, cheaply and largely with diesels. No wonder the Pacific Northwest has suddenly become one of the largest regional users of package diesel engines.

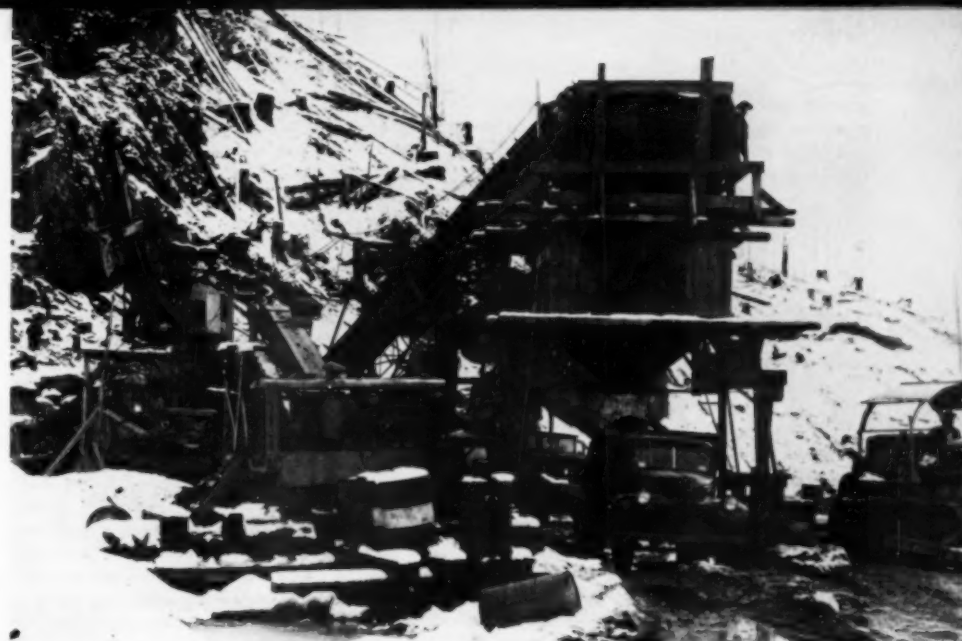
The pleasant realities of the Perpetual Harvest of Trees idea begins to strike deeply when the public and the lawmakers and labor start to realize that long after the last ton of ore, coal or oil is mined out of the ground, the Tree Farming Forest Products operator in the Northwest will be going on forever, bigger and better, undisturbed by the upsets of other U. S. enterprises based on mining a nonreplaceable chunk of Natural Resource. Actually, production of liquid fuel for mobile power, from Douglas Fir wood waste is already in the laboratory stage—along with liquefaction of coal and lignite and wheat straw! The beautiful fir tree may build your country home; make pulp for milady's rayon finery; paper for the boss to write letters; bags to carry groceries home; chemicals and insulation, and finally fuel to run the very diesels that help harvest Mr. Tree in the first place!

But the undying fact remains: the industry must have a permanent supply of merchantable trees that can be brought to the mill for conversion.

So it's no wonder St. Paul & Tacoma Lumber Co. is spending its millions on its tree farm operation—even while its sawmills shrink a little in size to bring consumption of logs into balance with production of logs by Mother Nature and the mechanized logger up in the woods.

It is hard for today's fast moving, overwrought generation of lost souls in America, to realize that 10 years ago, out of sheer economic necessity—not unhealthy and impermanent altruism, was born a pattern of private enterprise thinking that actually promises to remake America's whole industrial concept, and financial, labor and social structure. But this thinking is now in operation and the whole nation will be better for it.

Money came from plowed-back dividends. The old steam rigs that used to burn "cheap" wood waste, latterly given way to cheap California black fuel oil, on St. Paul and all other operations that propose to stay permanent, are either gone or going fast. Man-on-horse fire fighting with pick and shovels, gives way to city-type tank-pump fire trucks travelling hundreds of miles of new logging and access roads into those free farms—now that there is incentive and protection for loggers to



View of 4-unit rock crushing plant showing a remarkable aggregation of diesel equipment; left center, 2½ yd. Northwest Shovel powered with 160 hp. Murphy diesel, directly below which is seen an International 100 hp. diesel driving the primary crusher. Next right in foreground is a Caterpillar 100 hp. diesel. Seen under the loading bin are a Euclid, Cummins diesel truck, ahead of which is a G.M.C. diesel truck. Extreme right is a Caterpillar diesel bulldozer.

own and nurture their forest lands. Fires that once swept thousands of acres after a lightning storm, are extinguished by radio, plane and fire truck and walkie-talkies in 30 minutes!

All the procession of logger's sins, and bad judgment, from the 1880's to 1948, have dogged the St. Paul Mill people, just as have the good ideas and prosperous periods blessed them. Originally working in lush, overripe, overgrown sea-level timber country, with its 6-8-10 foot fir monsters, St. Paul Mill is now reaching skyward into smaller timber. Old Camp 2, still a railroad camp, reaches close to the 4500 ft. elevation on Mount Rainier's slopes. Camp 7, the bright, new flexible, modernized diesel operation on the south banks of the Puyallup River, is over 3,000 feet now. Lands that were logged before World War I now have nifty stands of 18 inch thick fir. . . . Ten million seedlings have been hand planted on old burned over areas that stubbornly refused to reseed themselves. Acreage let go for taxes because of unhealthy economic and tax burden conditions, is being reacquired. All access roads are fenced and gated and signs posted over the vast domain to prevent hunters and fishermen from dropping cigarettes and starting fires. Within two years, the steam locomotives that caused so many fires, and the steam yarders, despite being oil burners, that forced complete shutdowns in dry weather will be gone too. What has been done is to visualize these 200,000 acres in the same way a cemetery landowner does—not for today but for generations to come.

What once were trails, are now stub roads leading into selected timber stands. After loggings, the roads give access to the re-growth sections of land, and are maintained carefully for fire protection, thinning, pre-loggings and re-logging of smaller, waste material valuable as pulpwood and regu-

lar inspections and measurement of growth of the new crop. Four-lane logging highways connect all these little branch roads, so it is possible to reach all parts of the vast tree farm on a scientifically planned schedule. The low areas are worked in Winter, when thick wet blankets of snow cover everything higher up, the high country in late Spring, Summer and early Fall. The exact size and age of trees desired for cutting are mapped out and coordinated with the mill, so, that by means of this network of roads within the tree farm, they can be cut down and bucked into trailer-truck size mill logs, brought to market, according to a timed pattern laid down by the Chief Forester, for today, tomorrow and a series of tomorrows a century away! Today they may want plywood peeler logs from a thick V-shaped creek bottom pocket; next Thursday, a small stand of slim, straight knot-free firs for structural timbers; next Monday, the diesel yarders, loaders and trucks may bring down a cleanup of an old logged area for the pulp mills or short dimension lumber . . . or swap with another logger, for peelers are gold these days . . . that's why plywood is so expensive.

After harvesting, your scientific tree farmer cleans up the mess, which is controlled-burned, then the dormant seeds sprout new young trees. . . . If they don't sprout, or the land is burned over more than twice, hand planting is resorted to, but generally the huge seed-tree blocks left atop the crowns of the ridges, help nature to reseed automatically without assistance, so that life begins anew, in the forests. . . . In 80 years the loggers will be back!

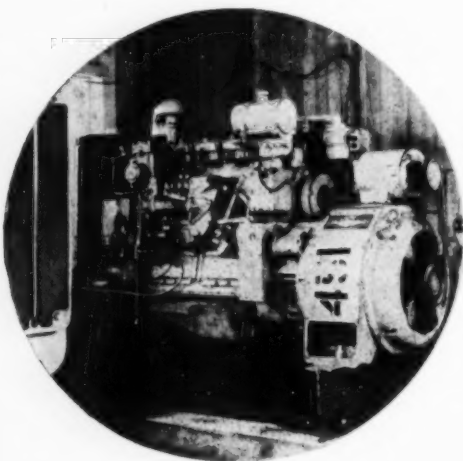
The Boomety Boom of a diesel tractor, belonging to the able firm of Strong & McDonald, prominent Northwest Contractors, rock and earth movers and excavators, can be heard above where we stand on a curve, around the upper end of a high hill. Its 8-foot blade is spreading coarse crushed rock

on a shoulder of another section of this modern, expensive logging highway, which leads up the south bank of the Puyallup River, at about 3100 feet elevation.

You turn around, and the whole panorama of 60 years of logging in the Northwest lies before you. In front of you, is a recently logged-off piece of land that looks like you planned to construct a building on it. To the right, less than half a mile away, is an area of lush tall Christmas trees—20-year-old timber racing skyward—a Junior Forest. Straight ahead, between yourself and the great white face of Mount Rainier, is a line of smoke from an old steam yarder and a steam mallet logging locomotive, higher up than you are, on the North Fork of the Puyallup River. At Camp 2, the remaining 40 miles of steam logging railroad operation—all that's left of what once was a 150-mile private railway. Below this far-off steam spectacle of yesterday, is a thin, green spread—5-year-old seedlings on what was once a bare, burned off leftover from logging with steam donkeys. High above all this scene, is a broad band of old growth original forest, just as it was two centuries ago, and beyond this, the thinning, park-like forests at the timber line, below the perpetual snows of Mount Rainier. All in one single view, from one spot. . . . Yesterday—Today and the Next Century, in one vast logging operation.

The diesel tractor's resounding artillery spells goodbye to the high lead skidder run by steam; the steam donkey engine; the steam loader; the steam railroad line with its 4 or 5% grades, awful track and switches, and millions of ties that quickly rot in the unballasted, poorly drained average type logging line built on the narrow ledges of a big woods, to be "Temporary" of course, but to outlast the maintenance money appropriated for a railroad that—"Why, It'll be gone in a couple of years — why ballast the track? ?"—but mostly, those "Couple of Years" drag on into a lifetime. The door is wide open to the diesels in the Northwest logging operations.

One of three Caterpillar diesel generating units which supply current for lights, refrigeration and various services at Camp 7 headquarters.



Diesel is 100% used everywhere for portable electric power in larger units, and on all tractors. Diesel won't stall so quick—and it "feels" like steam on a heavy pull.

Just prior to the last war, St. Paul-Tacoma Lumber Company had made its decision to go on a permanent, sustained yield basis, and began an orderly survey and mapping and re-orienting its whole vast empire of Mountains and Valleys, considerable of which is interspersed with sections of the old original Northern Pacific Land Grant timber.

With the war rush to grab lumber subsiding, the Company mapped out plans in 1947 entirely to abandon all the old logging railroad serving that part of the operations on the south bank of the Puyallup River. This logging railroad, modern in its day, and known for the size and power of its rod and geared steam locomotives, ran for over 100 miles in the Company holdings. The change-over plan called for full scale logging operations to go forward simultaneously with removal of 60 miles of the rail line system and to build the key logging highway network without stopping production. Several access roads to bring in the logging crews to camp were utilized to start the conversion. General contract to build the roads and manufacture the thousands of yards of crushed rock ballast, including many stretches where blasting on rocky ledges was necessary, was left to Strong & McDonald of Tacoma, prominent Northwest contractors, who supplied the graders, excavating equipment, earth moving trucks and special dump containers, and set up their own portable rock crushers, construction camp and accessory facilities entirely independent of the main Logging operation.

In fact so ingeniously was the whole operation planned that it was possible to follow right behind the road contractor and start truck logging in the area south and considerably above Camp 7, as the South Side operation is known.

Seven of the old Shay and Malet steam locomotives and six or seven heavy Duplex steam skidders joined the 60 miles of scrapped rail line, and, together with the switches, tie plates and fastenings, a rather large tonnage of high-value scrap steel was liquidated to help pay for the new highway construction. All old steam equipment was oil or coal fired, and becoming obsolete and, after nearly breaking down in the War-time rush, was in sad need of repair.

Some 40 miles of heavy-duty, 3, and 4-lane rock surfaced road has been constructed. Because of terrific loads—far heavier than on Public Highways, (per wheel), and the need for excellent drainage to carry off wet winter snows and sudden heavy mountain rainstorms, four feet of ballast is put over the graded roadway, with one foot of crushed rock topping over this. The heavy 2-wheel wide-gauge trucks, each carrying a railroad flatcar of logs, keep the road well pounded, and any soft soil will work to the surface when wet and blow away in great dust clouds when dry, eventually leaving a crushed rock mat-type roadway, hard on the nerves of

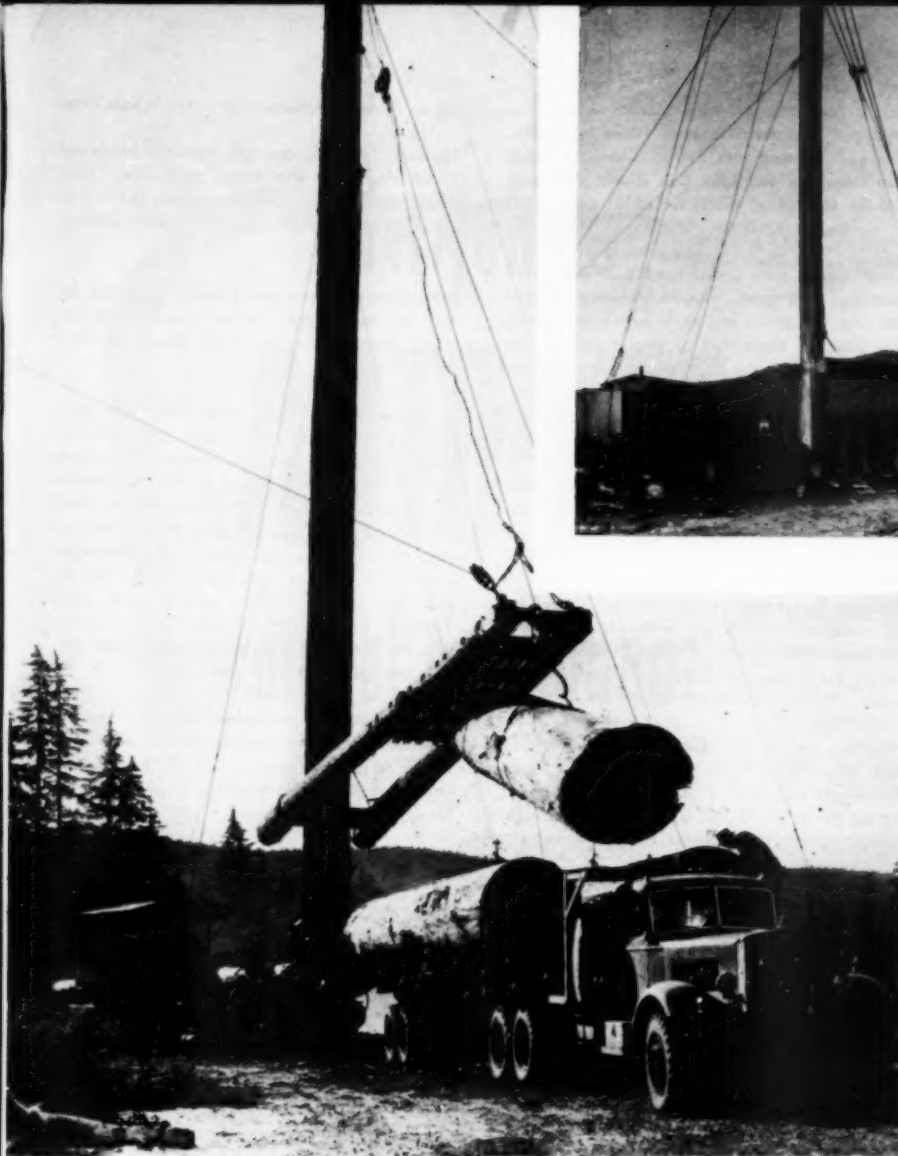
passenger car operators but ideal for truck drivers. Some of the road directly parallels the railroad line, hence it was made only double width at the start, giving access to the upper Logging operations even before the rail line was removed and the roadway widened to full width. Five miles was saved from the principal working circle as Camp 7 to the log dump at Lake Kapowsin, by cutting the highway over the hill instead of following the valley as the rails did to gain altitude without excessive grades. Maximum grades on the new logging highway are held to 6%, with feeder roads sometimes exceeding 15% to save costly highway construction up steep mountains. As all heavy loads go downhill, and empty trucks with trailers riding the cab "piggy back," a 15% grade for these air braked monster trucks is not excessive or unsafe.

Strong and McDonald operate a rather extensive fleet of all-diesel equipment. Starting off with a pair of rock crushers, which include two Pioneers and one each of a Lipman and Diamond, two units of the four being worked in conjunction with one of the primary crushers to provide large quantities of fine crushed and screened rock for topping, practically everything they operate is diesel. One of the Pioneer crushers is driven by an International 100 hp. diesel and a 160 hp. Murphy diesel drives the 20 x 36 Diamond machine. Worked in tandem or triplex, the crusher operation will produce 1,000 yards per day. The company has 3 Palmer 30 kw generating sets, driven by International Diesels; 3-2½ yard Northwest shovels driven by 160 hp. Murphy diesels; a dozen Caterpillar diesel tractors of 105 hp. and up; 6 Euclid Trac Trucks powered by 150 hp. Cummins diesels; 3 rear dump 9 ward Euclids driven by 150 hp. Cummins diesels and 6 Kochring Dumpsters, driven by General Motors 4-71 diesels (these are slow speed, side dumping earth handlers that run equally well in both directions and used for making deep fills.).

Light and power for the Strong & McDonald camps is all diesel generated. In operation, generally the rock crusher layout is mounted near the face of the worst rock cut on that particular section of the new road. Thus blasting the rock for the roadway provides primary rock for the crushers, and placing generally involves downhill runs for the loads, and uphill empty.

While the main logging highway arteries are super highway standard of construction, thin, winding trails often take off to a bit of choice Forest Service acreage where a few prize specimens can be gingerly taken out one at a time, by old dobbie or a small truck or tractor towing outfit. The damage and cost of building straight, heavy-duty roads is thus saved, and the trail-roads make excellent fire and access trails later on. The entire road system will permit moving up to 500,000 feet of logs per day to the main log dump at Lake Kapowsin, from one half of the entire operation. When the North Bank operation at Camp 2 is converted, St. Paul Mill can log 1,000,000 feet per day.

From the logging point of view, St. Paul Mill has gone overboard for mechanized and self-



Berger loader, powered with Cummins 150 hp. diesel, lowering a 3½-ton log on a Mack diesel truck.

powered machinery, from one end of the woods to the other. Gone are the days when a section gang on a speeder can block a logging train for hours while it fixes up a low joint or a spread rail. From this 1948 nucleus of primary logging highways, will eventually grow a 100 mile network to reach every corner of the tree farm, forever. All operations will funnel to the headquarters and log dump at Lake Kapowsin, railhead for the Northern Pacific, where the timber is reloaded on rail cars, either dry, from the ground, or winter storage in Lake Kapowsin. Sawlogs and pulp logs go to the mills at Tacoma, while giant peeler logs go to the Vencer plant at Olympia, a fairly recent acquisition to round out the changing character of the company's interesting operations.

Eventually all the area between the South and West banks of the upper White river, the Carbon & Puyallup Rivers will be embraced by this road-way network, that will enable the Forester to se-

lect practically every tree for the week's cut, from maps, aerial photographs and roadside study of its every potentiality.

Most of the regrowth land will restock itself in from 60 to 80 years, and part of the old logged areas around Lake Kapowsin will be logged again in about 25 years. Meanwhile the Company is gingerly spreading its holdings over a wide area, and getting supplementary timber from many small tracts, to fill in the gap between today's heavy cutting and the tree-growing potential of its tree farm. Eventually it is expected that the present layout will balance out at around 100,000,000 feet of growth and harvest per year, for many years to come.

The company's extensive new layout of equipment includes 14 giant LTSW Mack Trucks, of the wide gauge variety—too wide for standard highways, but almost exactly the same width as the bed of a railroad flatcar. These trucks each

Berger Yarder, powered with 150 hp. Cummins diesel, lower right, drags the logs on the high lead rigging to the loader, lower left.

One of three International 30 kw. portable generating sets used on the Tree Farm Project.



have a Freuhauf super logger trailer; extra large radiator and fuel capacity and giant tires. The present fleet is powered by 195 hp. Mack engines, but can be converted with little trouble to diesel drive if requirements make it necessary. Downhill, with a big load, the gas engines' inherent weakness—the suction side of the engine through the carburetor, makes them better brakings on a steep hill with a big load—enough so the Company feels it offsets the fuel economy of the diesel. Also, the main power drag is on level ground and returning the empty truck uphill. Six or eight forward speeds and four reverse are provided in the duplex transmission for varying loads and grades.

On historic Bailey Willis Trail, at the divide between the Puyallup and Mashel watersheds, around 2600 ft. elevation, a brand new, ultra modern logging camp was built—New Camp 7. A double row of offices, two-man living quarters, showers, wash facilities, large dining room and

hall, kitchen, large refrigerated space, a complete sewage disposal plant; "Boardwalk" all landscaped with lawn and flowers, and a complete diesel power plant with two Caterpillar diesel light plants—a 30 and a 40 kw. installation, have been built in this gently sloping, spacious hilltop area, where every break in the clouds lets sunshine through (if any, they'll tell you in these rain-drenched hills!). This is considered the most modern, sanitary logging camp, and one of the most beautifully situated, of any in the Pacific Northwest. Every part of the entire South Side operation is accessible to this new Camp, which replaces old Camp 5, located at the main line railhead in the river valley below.

Some 25 pieces of heavy, modern diesel equipment are used in the woods operations. Six Caterpillar tractors, equipped with Hyster drum winches, for towing logs or simply moving things—such as stumps, trees, buildings, yarders and loaders mounted on skids, rocks etc. One of them has a Dozer blade for road work mounted on the front, also. The Cats are powered from 40 to 131 hp.

An Allis Chalmers grader for road work, powered with a 65 hp. General Motors Diesel; 4 Allis Chalmers tractors, each with 150 hp. G.M. diesel, and equipped with Carco hoist and dozer blade; a 150 hp. Cletrac tractor with Carco Hoist

and Dozer blade; 2-150 hp. Marion Shovels, one equipped as a portable Heel Boom log loader, and each powered with 150 hp. Cummins diesels two Ohio and one Link Belt cranes, each with 145 hp. Caterpillar diesels are added diesel items of equipment.

Great success with flexible and fluid drive type couplings with speedy pneumatic controls, placed between the diesels and their driven machinery, has been the experience of loggers used to the feather touch of the old steam rigs. The introduction of the Fluid Drives, has made the diesel as smooth, powerful, stall and damage proof as the best of the old steam driven rigs.

The yarders and loaders that replaced the steamers, the husky workhorses that haul logs to the truck loading positions on the end of long looped cable sets, are generally diesel. Two are Berger Donkeys, with 150 hp. Cummins diesels; one is a Berger loader with 165 hp. General Motors diesel; another is a Berger yarder with 275 hp. Cummins diesel; a pair of Skagit Donkeys one of which has a 225 hp. Waukesha Diesel and the other a 150 hp. Waukesha diesel.

Working under Mr. Griggs, on the logging side is Mr. Tony Zoffel, General Logging Superintendent, and one of the picturesque Loggers of the Pacific Northwest, his son, George, follow-

ing in Father's footsteps, is Assistant Woods Supt.

Norman Jacobson, one of America's renowned Forest Engineers, who knows more about trees than practically any living American, is the Forest Engineer for the Company, also working under Mr. Griggs.

Manufacturing, Sales and Finance is headed by Mr. Corydon Wagner, native Tacoman and one of the shrewd brains in today's West Coast lumber picture.

Gone forever is the day when long, thin steel cables, strung between tall spar trees and anchored to husky, stubborn stumps, pulled logs a mile with power generated by the old reliable steam donkey engine and its system of shrill whistle signals. Today's logging moves compact, fast, powerful diesel equipment on good roads, right to the base of each tree, literally, and by pick and choose, harvests a crop that yields **THREE TIMES** the valuable wood products that the same size tree would yield under logging methods of 40 or 50 years ago.

Today, nothing is wasted on the modern dieselized Tree Farm, and tomorrow's harvest of timber is growing side by side of the block of trees marked for next week's harvest to feed the hungry mills and factories.

One of three, 2½ yd. Northwest shovels, powered with 160 hp. Murphy diesels and one of three Euclid, Cummins diesel-engined dump trucks at work on Tree Farm road job.



# Switch to **AUTO-LITE** diesel equipment

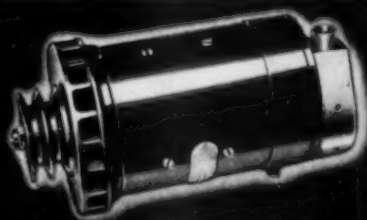
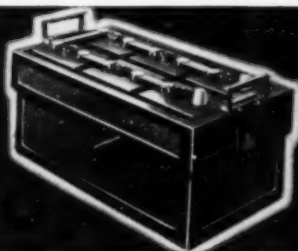
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# DIESEL DREDGES OPEN UP LOUISIANA OIL FIELDS

By WILL H. FULLERTON

**T**HE northern shoreline of the Gulf of Mexico is one of the hottest spots in the world in today's oil exploration and drilling operations. For years past, well after well has been put down in lower Louisiana, the location of these wells pushing closer and closer to the edge of the Gulf. Louisiana's vast coastal marsh area has been combed by the geophysical exploration crews and one would think that every possible location for an oil well had long ago been registered. Yet the work goes on, not only in the marshes but in the Gulf itself, for many miles offshore; hundreds of new wells are planned, some of these in the Gulf and others in the jungles and marshes.

The offshore wells are handled by a technique all their own; some are drilled by crews operating on practically permanent platforms built from the ground up; other drilling rigs are used on floating bases made from converted surplus army or navy hulls; diesels play a big part in these operations, not only in powering the rigs themselves but also in driving the countless boats used for exploration, bringing materials and equipment to the rigs, and transporting personnel. And diesels play an equally important part in the marsh locations of this area.

For most of these marsh operations, dredging is a major factor. Road-building through these marshes is hardly to be seriously considered; there is simply no bottom on which to put up a road acceptable for hauling heavy drilling machinery and supplies, and the cost of road-building would be terrific, all the more so when it is considered that it would be for rather temporary use at best. When the wells are dry—as must happen to all wells eventually—who would want a road into these marshes?

So the simplest transportation system is to use the existing canals and bayous to get as near as possible to the location and then dig a canal the rest of the way. Dredges can also be used to pump up filling for raised mounds for drilling platforms; and as diesel fuel is easy to transport and is readily obtainable especially in the oil country, diesels power plenty of dredges.

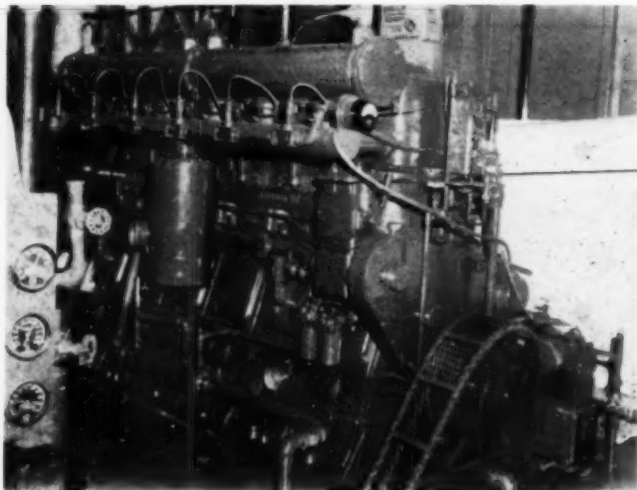
One new dredge designed especially for service in Louisiana's oil fields is the Harvey and it uses a couple of diesels, for main and auxiliary purposes. This dredge belongs to J. Ray McDermott & Co., Inc., whose headquarters are on the Harvey Canal; which, incidentally, is one of the busiest

little waterways in this country or probably in the world. This waterway was promoted and dug by a man by the name of Harvey, who dreamed of making a navigable connection between the Mississippi River and the bayous which drain into the Gulf. The idea was sound; today, the Harvey Canal through its locks into the Mississippi not only connects the river with the Gulf but also is a permanent part of the Intracoastal Canal, the protected waterway system from Brownsville, Texas, reaching clear to Florida.

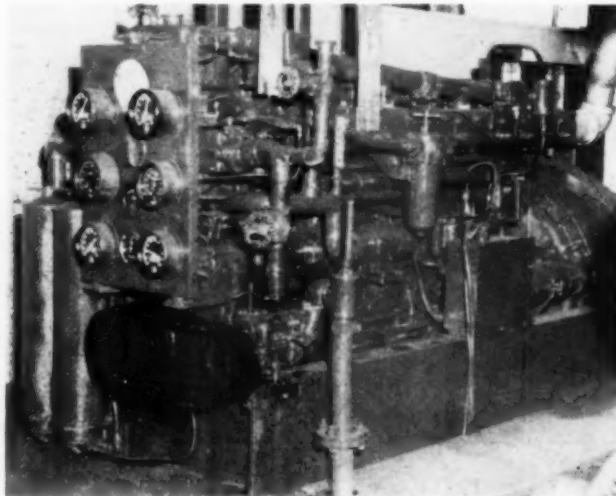
Multiple tows of oil barges almost make a long bridge from one end of this canal to the other; and on the Harvey Canal itself, both sides are rapidly being filled with boatyards, engine and machinery service stations, headquarters for dredging and towing firms, and distributors for oil-field equipment. The McDermott firm has had its main office here since 1936, and from here has carried on its work of dredging, pile-driving, lock building, and general oil field construction.

The corporation owns three suction dredges, a big clam-shell dredge and ten drag-lines, and handles construction anywhere from Texas to Florida's West Coast.

Port side, 200 hp, main Atlas diesel, looking towards pumping machinery.



Starboard side of Superior diesel which drives 100 kw Delco generator.



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The Atlas-engined dredge "Harvey"; McDermott plant in the background.

The new dredge *Harvey* is built on an all-steel hull 77 ft. long, 28 ft. wide and of  $7\frac{1}{2}$  ft. draft; the designers were Capt. A. E. Olsen, McDermott's general superintendent, and Lew Jensen, sales and installation engineer for Arthur Duvic's Sons, marine engine and equipment firm of New Orleans. The hull and deckhouse were built by Alexander Shipyard, New Orleans, and the rigging and engine installation were handled by Capt. Olsen's crew after the hull had been brought around to the Harvey Canal.

The main engine, furnished by Duvic, is an Atlas Imperial diesel, 6 cyl., 9 in. bore by  $10\frac{1}{2}$  in. stroke, developing 200 hp. at 514 rpm.; this is a stationary model. The engine foundation is not a part of the hull but was also designed and furnished by the Duvic organization; dredge hulls, carrying heavy engines and pumps, are apt to hog or sag when the dredge changes position or when load conditions vary, and if the engine foundation is an integral part of the hull, it follows that alignment will be lost. The separate foundation is believed to be a better system, and aside from alignment reasons, Capt. Olsen points out that in case of an engine change, the entire engine and foundation could be removed and a new installation made in 8 hours.

The Atlas is equipped with a Fulton-Sylphon automatic stop device, guarding against low lube pressure and high cooling temperature; the engine is stopped automatically as this device is no mere warning signal. Fuel filters are Cuno, with Purolator metal-edge filters protecting the lube oil; a Luberfiner is installed for double safety. Engine starting is by air, with no reverse. A

Quincy compressor with a pilot unloader is driven by a power take-off at the forward end of the engine; the unloading of the compressor can be adjusted for any desired pressure. On the same sheave a  $2\frac{1}{2}$  in. Marine Products centrifugal water circulating pump is installed. The air cleaner is a Vortex, the pyrometer Alnor. A Madison-Kipp lubricator is supplied for full lubrication of cylinder walls. For lube oil, Capt. Olsen uses RPM Delo, 30.

This main engine is direct connected to the main dredge pump through a Falk flexible coupling, with the engine extension shaft supported by a Dodge roller-bearing pillow block. The pump is a Type A Morris centrifugal, made by the Morris Machine Works; suction is 12 in., discharge 10 in. Pumping capacity is rated at about 200 yards per hour, depending on the type of soil; the dredge will handle mud, shell, grass or clay, and production may exceed the above figure.

As there are numerous pumps and other pieces of machinery to be driven by electricity, an ample current supply has to be provided. The main generating unit is a 100 kw. Delco generator driven by a Superior diesel, 8 cyl.  $5\frac{1}{2}$  in. bore by 7 in. stroke, turning at 1200 rpm. Another identical unit is on the dock, and in case of engine or generator failure, the entire unit can be lifted out and replaced in 8 hrs. "This may sound like an expensive precaution," says Capt. Olsen, "but dredging isn't a cheap operation and we cannot afford to have a dredge laid up very long for repairs. By keeping a spare ready, we can have the dredge back in service in a hurry and then make our repairs or overhaul at our con-

venience and do a good job without rushing." An I-beam track, with trolleys, is built-in for ready engine-changing; pump parts can also be removed via a trolley and chain-block system; the main engine is also served by beam, trolley and block to facilitate heavy repairs if needed.

There is also an emergency generating set, a 2-cyl. General Motors Series 71 diesel driving a 20 kw. 115 volt d.c. generator; this unit drives a fire pump and compressor; this auxiliary takes care of "dead ship" starting. The G-M diesel is electric starting, using a 12 volt system; the Superior is also electrically started, with a 32 volt starter. Cooling of the G-M set is handled by the main Atlas cooling system; the Superior generating set uses a Harrison heat exchanger for cooling both water and lube oil.

The electrically operated machinery aboard includes two  $2\frac{1}{2}$  in. Gardner-Denver service pumps, each using  $7\frac{1}{2}$  hp. d.c. motors; a 2 in. high pressure fire pump, with a 5 hp. 115 volt d.c. motor; a 40 hp. 230 volt d.c. motor for the winding gear, this unit having a reverse through a 10 C V-belt drive; a 115 volt motor driving an auxiliary Quincy compressor; an automatic bilge pump; an electrically-driven fuel transfer pump. A 75-watt RCA ship-shore phone also needs current, along with the flood lights and other ship's lighting service.

There are no living quarters, although bunks will be installed in the lever room for use of the crew while the dredge is in tow. There is no propulsion machinery as a tug will be used to move the dredge from one location to another.

# THE NICKEL CADMIUM STORAGE BATTERY

**T**HE long-discussed, highly efficient Nickel-Cadmium (trade name, NICAD) storage battery has at last reached the production stage after years of patent litigation.

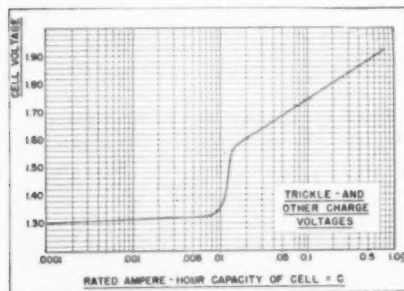
This new NICAD battery can be expected to arouse interest in many fields including the field of diesel automotive and transportation application.

Briefly, the Nickel-Cadmium battery offers some interesting characteristics. It is long-lived. It has great mechanical strength. Its internal resistance is low and it has a low rate of self-discharge.

The active material in the battery is nickel hydroxide and specially treated graphite for the positive plate and a mixture of oxides of Cadmium and iron for the negative plate. The electrolyte is pure Caustic Potash (KOH) in distilled water, the solution having a normal specific gravity of 1.190. This electrolyte functions only as an electrical conductor and does not enter into any permanent chemical reaction with the active material. Thus the specific gravity of the electrolyte remains constant. Since the electrical capacity of the cell is independent of the volume of its electrolyte, the quantity of the electrolyte can be reduced to a minimum and the plates located close to one another. This means low internal resistance and high capacity at high rates of discharge.

These batteries as manufactured by the Nickel Cadmium Battery Corporation are ruggedly constructed. The active materials are securely contained in finely perforated thin flat steel pockets seamed together along their edges and then locked into a steel plate frame. The complete plate group consists of a number of alternate positive and negative plates assembled on bolts and to terminal posts common to plates of the same polarity. Plate insulation is accomplished by polystyrene rod separators. The cell cans are liquid tight containers made of welded steel. All steel parts are nickel plated. Cells are assembled in the battery form by mounting them on wooden trays. The air space between the cells provides intercell insulation.

Chart showing relation between the voltage of a cell and the current passing through the cell.



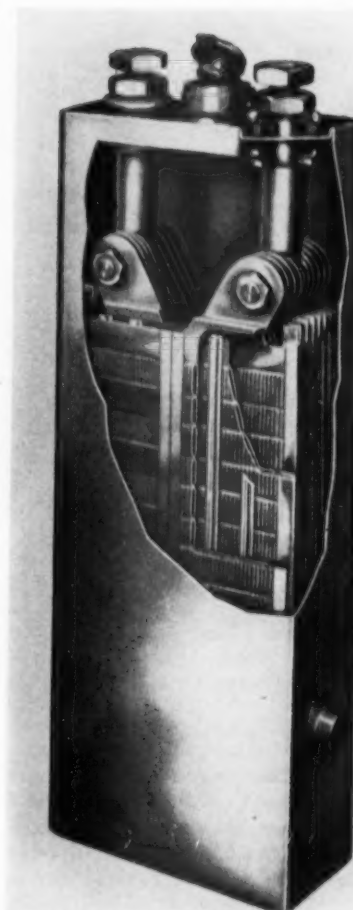
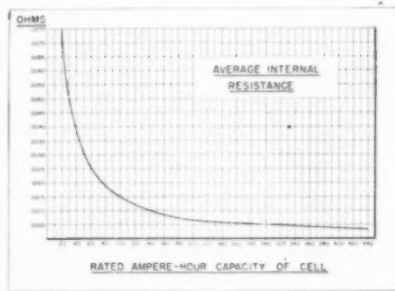
Charging of this NICAD battery can be accomplished by either the constant current or constant voltage method. The 7-hour rate is regarded as the normal charge rate when charging at constant current but varying charging rates may be employed with proper timing. A rate of booster charging 5 times the 7-hour charge current can be applied five to ten minutes at a time. A charging rate twice the 7-hour rate can be applied for one hour. NICAD batteries can be charged with existing charging equipment without modification. For instance, five, nine and eighteen NICAD cells are used respectively for six, twelve and twenty-four volt engine starting systems. Overcharging will not damage this type of battery.

Trickle charging is readily applicable to the NICAD battery as the Cadmium negative plates enable the battery to absorb usefully small charge currents over long periods to compensate for heavy discharges of short duration. The voltage of a fully charged cell on trickle or other charge depends on the current passing through the cell at any given moment. In trickle charge as well as floating applications, it is interesting to note that overcharging does not injure the battery, neither will it gas nor consume any water when on charge or discharge at any voltage below 1.47 volts per cell.

To check the state of charge of an idle NICAD battery the accepted practice is to subject the battery for a short time to a suitable load and at the same time to measure the battery voltage. The value of the voltage will indicate the state of charge of the battery. It is unnecessary to take specific gravity readings in order to determine the state of the charge. Because the battery does not gas on discharge it is possible to use solid plugs, thereby rendering the battery unspillable.

The chemistry and mechanical design of the NICAD battery are such that it is considered indestructible under normal working conditions. The cell is all steel, the cell container is of steel with welded joints, the plates are also steel, with the active materials confined in steel pockets

Internal resistance is determined by dividing 0.15 by the ampere-hour capacity of the cell.

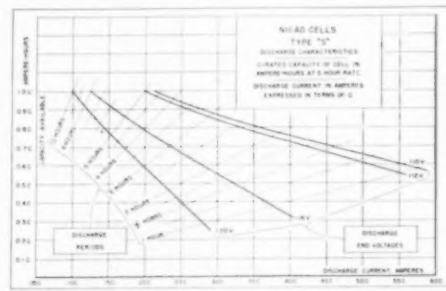


Cutaway cell showing interior construction.

in a manner which makes it impossible for these materials to escape and form a deposit at the bottom of the cell. For this reason no sediment space is provided.

Maintenance of the NICAD battery consists in keeping the outside of the battery clean and dry and the addition of pure water to compensate for evaporation and an occasional check-up of the density of the electrolyte, which it is necessary to renew only at long intervals. The battery is manufactured for all normal duty application, also for heavy duty and light duty.

Discharge characteristics of the Nickel Cadmium battery, Type "S" for normal duty, are plotted here.



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## Motor Boat Show

... continued from page 42 ...

mercial craft the safe way. They are the baffle-discharge nozzle for built-in systems and the squeeze-grip valve for portable extinguishers. The baffle-discharge nozzle is an efficient "total flooding" discharge nozzle for uniform distribution of gas and instant fire extinguishing at all levels from bilge to ceiling. Baffle nozzles are small, out of the way, compact and eliminate turbulent discharge. The squeeze-grip valve has a pressure closing seat, which is closed against leakage by the tremendous pressure of carbon dioxide within its own cylinder. This product is an important feature, because there is no time lost in applying the extinguisher immediately to the outbreak of fire. C.O. Two's advertising manager, Herbert W. Hass, and their Vice President and sales manager, M. A. Laswell, were at the display giving explanations and operations of their products, as was J. P. Maloney, general field sales manager of the Pyrene Division. A very interesting sound movie in color was another feature of this exhibit.

The Maxim Silencer Company exhibited engine silencers that have been supplied to the motor-boat trade for many years. All wet type marine exhaust silencers, the standard models M3 and M4 are designed for use with engines installed above the water, while the TR unit silences power plants below the water line. While talking with Frank L. Orr, Vice President and general sales manager and T. S. Willets of the company's sales staff, they both stressed the new products of the Maxim Silencer Company, which are the new blue top Mondel galley stove, weighing only 110 pounds, and the new lightweight, non-fouling CQR plow anchor.

The Snow-Nabstedt Gear Corporation featured primarily their new hydraulic actuated gear Model 3737. The dominant improvements are: (1) finger-tip control; (2) emergency operation, continued trip with locked forward clutch; (3) enclosed pump, which is easily removable. The second product shown was the S-N Power Take-off, Model 1041. This model features optional length and diameter of output shaft and simplicity of lubricating through short grease passages. Rated horsepower for diesel engines is 70 hp. at 1200 rpm. The third product, which was the cut-away model at the show, includes the new type S-N reduction and reverse gear Model 3745-2045. This unit embodies the design of a cone type friction clutch which is also spring loaded. The reduction gear is of herringbone type and is supported in a self-contained housing. This unit is splash lubricated and a wet type clutch. The fourth new product, which was shown for the first time to the public, is Model 3715-2015. It is a wet type clutch with planetary gear train and is supplied with 2:1 or 3:1 reduction ratios. This technical data was given to us by Ted Nabstedt, publicity director of S-N. Also on hand were J. Sauerez, general sales manager, and L. Collar, service engineer.

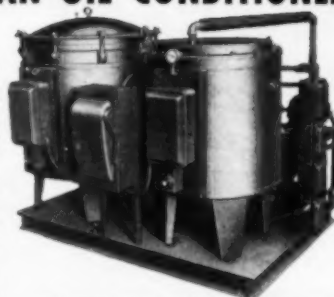
Discussing the show with Ed. Morgan of Fram Corporation, he stressed the importance of their

# Here's Engine Protection

with never-before savings and advantages...

## Complete purification of used LUBE OILS with the HOFFMAN OIL CONDITIONER

Lube oil continually restored to like new specification! Not only protects against engine wear BUT ALSO brings important oil savings! The Hoffman Oil Conditioner removes soluble and insolubles (solids, moisture and fuel dilution) without high maintenance cost of centrifuges. Unit consists of vaporizer and cartridge filter, complete with



oil pump and electric connections. No steam or water... portable and separate operation, if desired. Capacities of 50 to 600 g.p.h.



## HOFFMAN CARTRIDGE FILTERS

### For Diesel Fuel and Lube Oils

#### Exclusive Cover Lifting—Insulated Head

Compare the advantages! New, convenient cartridge change since cover swings clear on exclusive lifting device—swing bolts simplify removal. Hoffman Cartridge Filters are furnished in wide range of sizes, for 7 x 18 (Navy) or 11 x 18 Cartridges, either repackable or throw-away types. With or without heaters and controls to suit your requirements.

*Write Now*

Write NOW for Bulletins and Details on HOFFMAN Filtration Engineering Service

### FILTRATION ENGINEERING SERVICE...

For the right answer to your filtering problems, a Hoffman filtration engineer will survey your requirements and furnish recommendations based on detailed analysis of all factors. Ask for this service—There is no obligation.

# HOFFMAN

FILTRATION DIVISION  
UNITED STATES HOFFMAN MACHINERY CORPORATION

212 LAMSON STREET, SYRACUSE 6, NEW YORK  
CANADIAN PLANT: CANADIAN HOFFMAN MACHINERY CO., LTD., NEWMARKET, ONT.



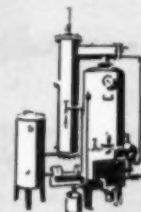
FLOTATION UNITS  
for fully automatic  
clarification of  
soluble oil coolants



DISC FILTERS  
for continuous flow  
in small space



PRESSURE FILTERS  
for fine filtration



VACUUM STILL  
for solvent recovery



VACUUM FILTERS  
self-cleaning  
continuous operation

new seven sizes of lubricating oil filters for diesel engines. Along with these new seven lubricating oil filters, they have available complete installation data for these units of oil filters applicable to diesel engines. Also at the booth was A. Sherman, New York district manager.

A packaged automatic fire extinguishing system which owners of pleasure and commercial craft can easily and economically install themselves in a day's time, was shown by Walter Kidde & Company, Inc. Component parts for the Kidde automatic system comprise a carbon dioxide stor-

age cylinder with discharge head, thermostat fire detector, remote control pull-box and cables, and multi-jet discharge nozzles for flooding the engine compartment with inert carbon dioxide gas. R. Cox and P. Weimann of the marine department were at the booth.

Highlighting the exhibit of the Gulf Oil Corporation were explanations by the company's representatives of an efficient method of removing gum from motor boat fuel systems which makes unnecessary the removal of the tank for cleaning and replacement of lines. In addition to show-

ing a complete line of Gulf marine fuels and lubricants, a cruise guide bureau at the company's booth furnished information for boat owners planning trips into southern waters. Manager of Gulf's marine sales, William Boyd, Jr., and R. H. Watts, New York marine sales representative, were at the display.

The Federal Marine Motors Company electric tachometers and gauges are now available for diesel engines. E. W. Morton, President of Federal, pointed out that the tachometers and gauges for fuel, oil pressure, and temperature are unique in that they operate entirely by wire, do not require special lengths of tubing and therefore eliminate the cost of tubing and tubing failures. They are quick and easy to install, require only cutting the wire to length, and they can be operated at considerable distance from the engine. Federal electric tachometer is guaranteed accurate within 2%. Two or more of these tachometers can be connected to the engine for simultaneous readings at different locations, such as flying bridge controls or engine room installations. The Federal tachometer has built-in illumination and is noiseless. All instruments employ improved seals to permit installation in exposed locations.

American Bosch Corporation had an interesting exhibit in its traditional location on the third floor, featuring its line of diesel fuel injection equipment and also its marine electrical equipment, such as magnetos, generators, regulators, ignition coils and windshield wipers. This display was supported by personnel from the Springfield factory and from the New York field engineering office, consisting of Donald P. Hess, President, Foster N. Perry, Vice President, Hans Hogeman, Chief Engineer of the fuel injection section, Thomas Kiely and members of the regular New York staff. Several members of the Board of Directors of American Bosch attended the show, including Arthur Davis, Herbert Guterman and Charles Terry.

Long manufacturers of marine instruments and gauges, the Electric Auto-Lite Company had an interesting display. Their line of products includes ammeters, electro-magnetic type gauges, tachometers, vacuum gauges, etc. An interesting bit of news reached us that R. C. Held of the Sales and Production Department, who was at their exhibit, has been with Electric Auto-Lite since 1911. At that time there were only 12 employees and he has seen the company grow from 1 to 28 plants and from 12 to 32,000 employees.

Many more happy years for Mr. Held. C. R. Zink of the Starting and Lighting Division and George Moeller of the Battery Division, also attended the show.

A new product shown by the Red Wing Motor Company was the 65 hp. direct drive "full diesel" model. It is a medium sized heavy-duty diesel with every possible feature for uninterrupted satisfactory performance. This model can reach 79 hp. maximum at 2600 rpm. Seen at the display was J. R. Trautner, President and General Manager, and A. Julsrud, sales manager.

# Air is safe!

# Air is free!



**PERFORMANCE DATA**

Air Pressure p.s.i.	Maximum Crank. H.P.	Piston R.P.M. (Approx.)	Air Consumption c.f.m.
100	10	3000	250
150	15	3000	400
200	20	3000	550

Variable factors control motor application. Under normal cranking conditions one motor may crank engines up to 1000 or more cu. in. displacement. Two motors may be used for larger engines.

**AIR CAPACITY REQUIREMENTS**  
A 20 cu. ft. storage tank at not less than 150 p.s.i. should give about 30 seconds cranking. This varies with engine size and temperature. Maximum permissible pressure 250 p.s.i. When temperatures drop to freezing or lower it is desirable to have pressure of 100 p.s.i. or more and an ample supply of air.

**APPLICATIONS**  
Typical applications include: mobile road and construction equipment, stationary engines used in hazardous atmospheres (mining, oil refining and related industries), small generating plants and numerous marine applications where compressed air is available at suitable pressure.

**Harness It For Quick, Dependable  
Low-Cost Starting With The  
LEECE-NEVILLE**

## Air Cranking Motor

• Here is an air-operated motor which guarantees absolutely safe starting of Diesel and gasoline engines in the presence of flammable matter or in combustible atmospheres and at the same time offers economy, dependability and long-term satisfaction in any application. Wherever compressed air (or natural gas under suitable pressure) is available . . . the Leece-Neville Air Cranking Motor may often be the most practical method of engine cranking because it eliminates electrical upkeep and requires a minimum of maintenance itself. See your nearest Leece-Neville Service Station for an analysis of your starting problems or write us direct.

*The Leece-Neville Company, Cleveland 14, Ohio.*



**LEECE-NEVILLE**  
Pioneer and STILL Quality Leader

The central feature of the Sperry Gyroscope Company exhibit was the new Magnetic Compass Pilot, prominently displayed in their booth on a miniature boat which could be steered at the pleasure of the show-goers. This new magnetic compass was developed since the war and experimented aboard ocean fishing craft, river towboats, tugs and yachts, and has proven a reliable means for automatic steering. Among those present at the Sperry Gyroscope exhibit was O. B. Whitaker, sales manager of the Marine Division, who recently received his 35 year pin for services rendered the company during this period, also J. A. Fitz, director of advertising and publicity, who was responsible for their attractive exhibit, and W. D. Van Loan, Marine Products sales engineer.

Featured in the 1949 line of R.C.A. marine equipment are an outstanding new combination entertainment broadcast receiver and two-way marine radio-telephone and a new radio direction finder that operates on beacon, broadcast or marine bands, shown for the first time by the Radiomarine Corporation of America. Outstanding attractions claimed for this new radiotelephone include small power consumption, magic-eye tuning tube and separate antenna control for maximum transmitter efficiency, circuit design that will not permit overmodulation, integral power unit, and miniature tubes. C. A. Magnell, manager of small craft sales and in charge of exhibit, attended the show, along with H. P. Aldridge, general sales manager. Several members of the sales department also gave explanations of featured products.

Sperry Products, Inc. displayed three types of hydraulic controls for marine application. The advantages of accuracy and ease of installation of the single line Sperry controls in boats and industrial equipment were explained at the company's display. A Packard marine engine and a General Motors marine diesel engine were shown with working hydraulic controls for both throttle and clutch operation. Sperry furnishes control mounting kits for both these engines. J. B. Farwell, President, attended the Show, and also Ed Lang, advertising manager, along with F. Tabshay, design engineer, and C. T. Morgan, sales engineer.

A valuable addition to the reduction gear products was the G. Walter Machine Company's Offset Reduction Gears and Transfer Drives which are designed and built for today's high speed gasoline and diesel engines. Mr. Walter, President, told us of the reduction gear's quiet, trouble-free performance and long-lasting service, which has filled an urgent need for dependable gear drives by boatmen everywhere. This offset reduction gear is a rugged gear unit for work and fishing boats to swing the large slow-turning but more efficient propellers. The second product featured was the Walter Clean-Flo Cooler which is an advanced type of closed outboard system. Sandy and muddy waters can neither grind up the circulating pump nor build up in the engine water jackets, and salt water corrosion is eliminated. Mr. Walter's chief engineer, F. Brown, was at the display during the show giving first-hand information of the featured products.

# DIESEL BEARINGS



## BRONZE and BABBITT... STEEL and BABBITT... ALUMINUM ALLOY

Why does the majority of the manufacturers of diesel engines... including all of the leaders... get their bearings from Johnson Bronze? Simply because we give them the type of bearings they require... made to precise specifications... and delivered on time.

Johnson Bronze has much to offer the diesel manufacturer. We help you decide which type bearing will deliver the greatest performance for the longest period of time at the lowest possible cost. We base all of our recommendations on facts... free from prejudice. We give you the benefits of our more than forty years exclusive bearing experience... our highly trained and skilled personnel... our complete facilities for testing and experimental work.

Isn't this the type of bearing service you can use at a profit? Write, wire or call today. Johnson Bronze Company, 445 South Mill Street, New Castle, Pa.

### For the ENGINEER

Bearing data sheets covering the fundamentals of Sleeve Type Bearings. It's FREE.



Call JOHNSON BRONZE at ATLANTA • BALTIMORE • BUFFALO • CAMBRIDGE  
CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT • KANSAS CITY  
LOS ANGELES • MINNEAPOLIS • NEW YORK • NEWARK • PHILADELPHIA • PITTSBURGH  
ST. LOUIS • SAN FRANCISCO • SEATTLE

Color motion pictures of hunting and fishing were featured by the Socony-Vacuum Oil Co., Inc., in an exhibit which presents many of the services and products the company makes available to the boat owners. One of these services is the series of ten cruising guides, covering the United States. Among the products shown were marine fuels and lubricants and the marine crankcase draining unit. On display also was Socony-Vacuum's Marine Station Development Program which has been improved to provide detailed plans about docks, bulkheads, floats and safety precautions. This program has proved popular among marine dealers, government agencies and municipal marine operators. George E. Maxwell, manager of the small craft department and recently elected president of the Marine Trades Association, and George Johnson, in charge of advertising and sales promotion, were on hand at the booth.

### G.E. Builds Largest Diesel-Driven Generators

FROM General Electric's review of "Electrical and Allied Developments of 1948," we learn that:

Six of the largest diesel-driven generators ever built at Schenectady were installed by the Mexican Light and Power Company. Each is 22 feet in diameter, weighs 54 tons, and is rated 6,000 kw at 167 rpm. They are designed for operation at 7450 feet elevation. The generators are

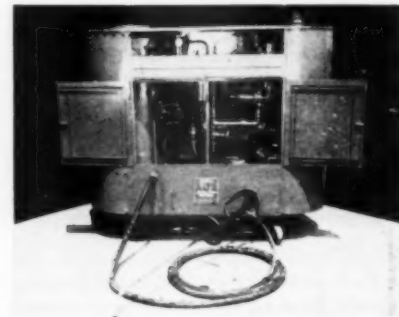
driven by the largest diesel engine, in point of power output, ever constructed in the United States. Built by the Nordberg Manufacturing Company, Milwaukee, 18 railroad cars were required to transport each disassembled engine. One of the largest diesel-generator sets installed in this country in recent years was that of the Iowa Light and Power Company. It has a rating of 5450 kw, with net output of 5,000 kw, since 450 kw is used to drive an induction motor-driven scavenging blower. The split generator is about 20 feet in diameter and weighs 37,000 pounds. It is driven by a Nordberg diesel engine.

A 4800 horsepower oil-fired gas turbine power plant, specially designed for locomotives, was run in the factory for more than 700 hours. Construction was started on two 3500 kw units, one for Oklahoma Gas and Electric Company to operate on natural gas, using the exhaust gases to heat boiler feed water, the other for the Central Maine Power Corporation which will be oil-fired and will be installed in a station to replace a 2,000 kw steam unit.

**Order Your Copy of the 1948 DIESEL ENGINE CATALOG, Vol. 13 now. Thoroughly revised — more complete — indispensable. Convenient order coupon on page 72 this issue. Mail it today.**

### Turco Storm King Steam Cleaner

TURCO Products, Inc., recently announced a wide selection of models of the Turco Storm King Steam Cleaner. Available for natural gas, manufactured gas or oil heating, it may be procured for stationary, portable or trailer use.



Turco "Storm King" cleaner

Designed for speedy, efficient and economical cleaning, the Storm King provides a choice of Steam Cleaning, utilizing 180 gallons of water per hour, or High Pressure Rinsing, utilizing 240 gallons of water per hour. Pressure of 150 pounds is maintained for either operation.

For further details or demonstration write Turco Products, Inc., 6135 So. Central Avenue, Los Angeles.

**Keep COOL...  
SAVE FUEL!**

**with Fairbanks-Morse Evaporative Coolers**

Here's the way to keep jacket water and lube oil at the same ideal temperatures—the way to gain real fuel savings and more efficient engine performance. Fairbanks-Morse Evaporative Coolers absorb heat through direct transfer and by evaporation of spray water on the coil surface . . . save up to 95 per cent in water and pumping costs when they replace heat exchangers using raw water. Write your nearest Fairbanks-Morse branch or . . . Fairbanks, Morse & Co., Chicago 5, Illinois.

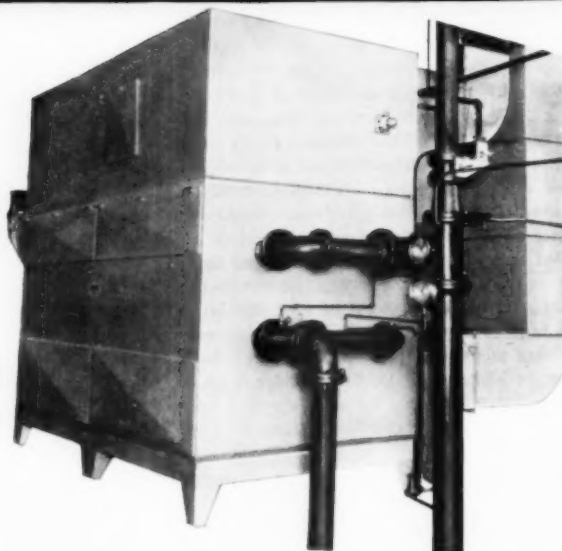
**SAVE WATER • SAVE PUMPING COSTS  
SAVE SPACE • SAVE FIRST COST  
SAVE MAINTENANCE EXPENSE**



**FAIRBANKS-MORSE**

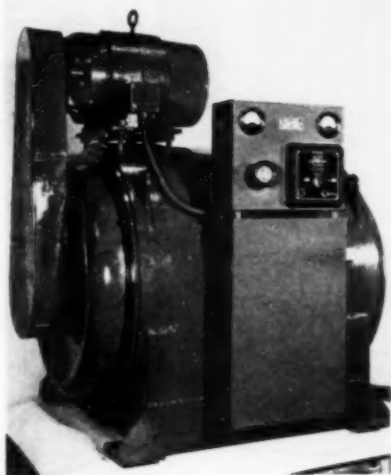
**A name worth remembering**

DIESEL LOCOMOTIVES • DIESEL ENGINES • STOKERS • SCALES • MOTORS • GENERATORS  
PUMPS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS



### New Series Katolight Alternators

**T**HE Kato Engineering Company have recently added a new series of alternators to their line. The new series permits a top capacity of 300 kw. at 1800 rpm., 60-cycles. The new machine is available at speeds of 720, 900, 1200 and 1800 rpm. It is available with direct connected exciter on the high speed designs and top mounted exciters on the lower speeds.



New 175 kw Katolight alternator.

All rotors are constructed with dampner windings to facilitate parallel operation. They are carefully banded with a steel wire to protect rotor field windings from centrifugal force damage due to moderate over speed.

The stator is made of 26 gauge coated dynamo steel with  $\frac{3}{8}$  in. ventilating air space for each 3 in. of lamination stack. Stator is held in all welded steel frame. Mounting feet are widely spaced to facilitate generator line up for coupling or belt drive.

The direct mounted exciters are so arranged so that the exciter armature may easily be removed without dismantling the alternator. The top mounted exciters are arranged so that V-belts may be kept at proper tension because of an easily adjustable exciter base. For further information write Kato Engineering Co., Mankato, Minn.

### Cooper-Bessemer Awarded Largest Gas Engine Driven Compressor Order

**T**HE Cooper-Bessemer Corporation has just been awarded the largest single contract of its kind. The contract calls for the construction of 21 new-type "Turboflow" gas engine driven compressors, the largest of their type in the world, for the Transcontinental Pipe Line Corporation's proposed 30" pipe line, which is to be built by Fish Constructors, Inc. of Houston, Texas. This award was just announced by Gordon Lefebvre, President and General Manager of Cooper-Bessemer.

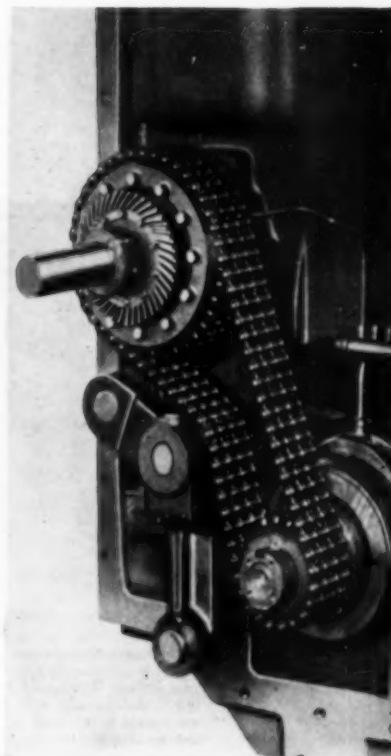
... and now please turn to page 62 ...

## DEPENDABLE DIAMOND GAS ENGINE DRIVES

### Timing and Auxiliary

• On the country's well-known gas engines that power oil and gasoline pumping units, recycling and refinery equipment, — Diamond Roller Chains have been successfully employed for many years as timing and auxiliary drives.

As on oilfield drilling, pumping and servicing equipment also, the long-life dependability, uniform quality, and great reserve strength are characteristics that have made Diamond Drives so widely preferred. **DIAMOND CHAIN COMPANY, Inc.**, Dept. 407, 402 Kentucky Ave., Indianapolis 7, Indiana. *Offices and Distributors in All Principal Cities.*



Close-up of Diamond Timing Drive on Buckeye Engine with governor and plate removed.

Buckeye Engines have Diamond Chain Camshaft Timing Drives.



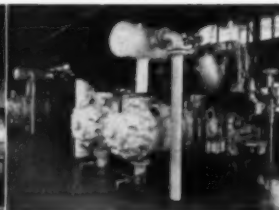
Sterling Viking II Gas Engine, Phillips refinery, Bartlesville, Okla.

Processing plant installation, Cooper-Bessemer compressors.

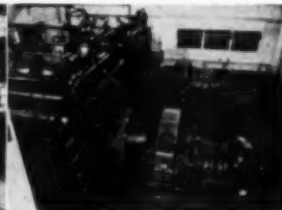
Ingersoll-Rand Six-Cylinder Gas Engines driving refinery pumping units.



Clark gas engine-compressor units in recycling plants at Sheridan, Texas and Frath, La.

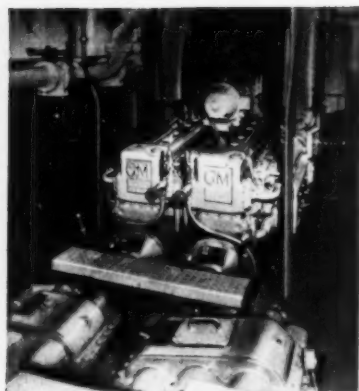


Hall-Scott gas engines driving centrifugal pumps, Spring Recycling Plant, Conroe, Texas.



National Transit Pump and Machine Co. gas engine power house installation.





Heart of the Bernard Samuel is this GM Series 71 Quad. Each engine can be individually declutched and turned to pumping duty as the need demands. With a speed of 17 m.p.h., she can shift from full speed ahead to full speed astern in seven seconds.



Philadelphia's new fireboat, the Bernard Samuel, designed by Thos. D. Bowes, M.E., prominent Naval Architect, measures only 75 ft., yet packs all the punch of her larger predecessors and, at the same time, far surpasses them in economy and flexibility. She pumps better than 5,500 gallons per minute at 150 pounds nozzle pressure.

## Brand-New Idea in fireboat design

THE Bernard Samuel's small size and great versatility can, in large measure, be attributed to her power plant—an 800 H. P. General Motors Series 71 Diesel Quad-6. Because of its compactness and greater power-per-pound 2-cycle design, this engine takes up less space—leaves more room for equipment. GM Diesel's instant, push-button starting enables the boat to get underway in a

hurry when the alarm sounds.

The same characteristics that made GM Diesels the choice of the Bernard Samuel's designer make these engines ideal for both pleasure and work boat power.

Write Detroit Diesel Advertising Department for free booklet "The New Idea in Fireboats" which gives the full story of the Bernard Samuel.

### DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... up to 200 H.P.

DETROIT 20, MICHIGAN

MULTIPLE UNITS... up to 800 H.P.

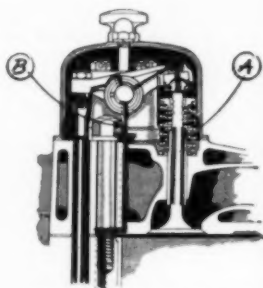
GENERAL MOTORS

**DIESEL BRAVN WITHOUT THE BULK**





**CASE D119C--PROVIDING GOOD VALVE ACTION IN DIESEL ENGINES.**



DIESEL ENGINE VALVE ASSEMBLY

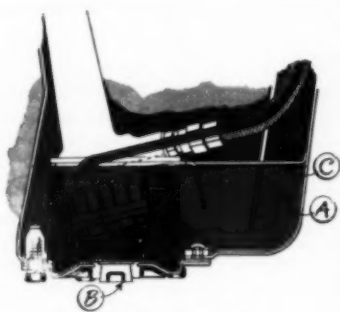
When Diesel engines, operating in tough heavy-duty service, were lubricated with compounded RPM DELO Diesel Engine Lubricating Oil, valve stems and guides did not gum up. They received thorough lubrication at all times and wear was negligible. RPM DELO Oil is recommended for all types of Diesels. Comes in several viscosity grades to meet all conditions.

A. Specially selected oxidation-resistant base stocks and special compounds prevent formation of gum and lacquer... oil film adheres to hot or cold metal surfaces.

B. Detergent compound keeps oil passages clean and open... and allows free flow of adequate supply of lubricant to wear points.

RPM DELO Diesel Engine Lubricating Oil is non-corrosive to all bearing metals. This quality and high stability assure sound bearings in Diesels for long service periods.

**CASE D119D--KEEPING PARTS CLEAN AND REMOVING CONTAMINANTS FROM DIESEL ENGINES.**



DIESEL ENGINE CRANKCASE

Cylinder walls, pistons, bearings and other parts of Diesel engines in heavy-duty service remained free of lacquer, and all contaminants flowed out with drainings when RPM DELO Diesel Engine Lubricating Oil was used.

A. A special compound in RPM DELO Oil loosens and removes lacquer and other deposits from parts and oil passages... and they stay harmlessly dispersed in the oil.

B. The finely dispersed contaminants, including condensate and dust, flow out freely when crankcases are drained.

C. Another compound in RPM DELO Oil prevents foaming—allows accurate measurement of oil levels and delivery of sufficient lubricant by oil pumps.

The engine-cleaning qualities of RPM DELO Oil help reduce wear on parts and prolong greatly the operating periods between engine overhauls.

For additional information and the name of your nearest Distributor, write  
**STANDARD OIL COMPANY OF CALIFORNIA**  
 225 Bush Street, San Francisco 20, California

**The California Oil Company**  
 Barber, New Jersey  
**The California Company**  
 17th and Stout Streets, Denver 1, Colo.  
**Standard Oil Company of Texas**  
 El Paso, Texas



Trademark Reg.  
 U. S. Pat. Office

... Continued from page 59 ...

Unusual fuel economies in the operation of these engines, made possible by "Turboflow" (a recent Cooper-Bessemer development) have been largely responsible for Transcontinental Pipe Line Corporation awarding this contract to Cooper-Bessemer. The contract represents authorization to build 70% of the gas engine driven equipment required for their 1949 construction program.

The 10-cylinder GMW gas engine scheduled for this project are rated at 2,400 bhp. each. As a result of the "Turboflow" development, these engines will draw 15% less fuel from the line than

formerly needed to operate conventional gas engines of equal horsepower.

This big advance in engine efficiency is primarily attained by incorporating considerably improved combustion efficiencies in gas engines, obtained by a more intimate mixture of the gas fuel with air and unique developments in ignition design.

In addition to 15% lower fuel consumption, "Turboflow" engines develop 10% more horsepower than other gas engines of the same size or equal displacement. This means simply that fewer engines will be required on a project of this kind, reducing both the number and cost

of engine foundations necessary in the booster stations. In turn, this greatly reduces the overall cost of installation, piping, housing and operating personnel. Less maintenance expense will be a further cost saving benefit to Transcontinental in the actual operation of the pipe line.

The Transcontinental Pipe Line is to be the largest and longest of its kind in the world. The 30" line will deliver 500 million cubic feet of natural gas each day from reserve fields in the Gulf-Texas sectors over a distance of 1840 miles to the terminus on the east bank of the Hudson River in New York City.

Distributors to be supplied by the Transcontinental Pipe Line now furnish manufactured gas to a population of over 9,250,000 in New York City, 3,786,000 in New Jersey and 800,000 in suburban Philadelphia.

While the total output of the Transcontinental Pipe Line will be 500 million cubic feet of gas daily, experts in the Gulf-Texas fields report sufficient reserves in that sector to supply Transcontinental with all the natural gas it needs for the next 30 years. This estimate is made with the assumption of a yearly withdrawal rate of 1.3 trillion cubic feet to start, increasing to 2 trillion cubic feet in the next several years.

Four hundred seventy thousand tons of steel will be required for the construction of the pipe line alone. Based on present deliveries of pipe, Transcontinental believes its line will be completed by the early part of 1951. Construction of the huge Cooper-Bessemer "Turboflow" units is to begin at once for completed delivery well in advance of that time.

### Hearty Congratulations To Oakite

FEBRUARY this year holds particular significance for Oakite Products, Inc., pioneers in the field of industrial cleaning material and methods. For it marks the completion of Oakite's fortieth year of cooperation with industry on its production and maintenance cleaning procedures.

John A. Carter, General Manager of the Company, in commenting on the increasing utilization of its methods and products by industrial plants, states, "The 40 years of achievement we celebrate this month can be attributed in large measure to the company's fundamental policy of rendering a service and selling a product on the side. In the years ahead, Oakite will continue to direct its efforts toward developing this service still further, along with the designing of new materials and improved methods for applying them, to the end that cleaning costs in industrial plants and shops may be substantially lowered."

It is interesting to note that since its founding in 1909, the company has steadfastly stressed service over and beyond the mere sale of its products. In support of this policy, it maintains a nationwide field service organization of 180 experienced technical representatives to provide in-plant as-

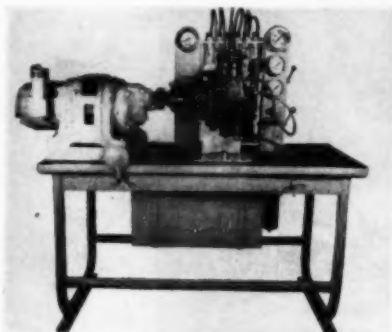
Learning Your Clutch Needs	<b>CUSTOM ENGINEERED</b>	Automotive and Aircraft
Analyzing the Problem		Trucks and Buses
Designing the Clutch		Tractors and Road Machines
Planning Production		Farm Machines and Implements
Tooling Up		Oil Field Rigs and Pumps
Manufacturing	<b>ROCKFORD CLUTCHES</b>	Industrial
Checking and Testing	<p>We realize that your clutch needs may be "different". Seldom are two clutch problems exactly the same. So we build clutches to conform with your product's design. Our engineers specialize in clutch research and manufacturing development. Their extensive experience in power transmission and control is at your disposal to find the right answer to your clutch problem. A print, showing your product's power transmission requirements, will command their careful study of the important factors involved and bring you their recommendations for giving your product the advantages of a custom-engineered ROCKFORD CLUTCH application.</p>	Mowers and Light Machines
Supervising Installation		Engines and Marine Units
Servicing		Machine Tools Production Units
		<b>ROCKFORD CLUTCH DIVISION</b> 1321 Eighteenth Street, Rockford, Illinois

sistance and to assure the most effective and economical application of its materials by its customers. Striking testimony to the effectiveness of this basic principle is indicated by the fact that, today, the company supplies more than 80 specialized compounds for cleaning and related operations in the diesel power and transportation field and in many other branches of industry.

### Fuel Pump Test Stand

A TEST STAND for accurately calibrating the flow of fuel to each cylinder of diesel engines from the fuel injection pump has recently been announced.

To make the tests, the fuel injection pump is mounted on a bracket and connected to a variable speed-drive. The fuel lines, which are ordinarily attached to the nozzles or injectors, are connected to a calibrating assembly. The fuel injector pump is then rotated by power from the variable speed drive and the exact amount of fuel being delivered through each line is accurately measured. By adjusting the output it is possible to exactly equalize the fuel injected into each cylinder.



New injection pump test stand

The test stand is a self-contained unit, complete with its own power, fuel reservoir and filter. The base consists of a formed steel table top mounted on welded steel frames.

For further information write to Automotive Products, Inc., of Portland, Ore.

### Honan-Crane Bulletin

THE new issue of "Clean Oil," telling how one firm saved more than \$30,000 using a central coolant clarification system, is being distributed by Honan-Crane Corporation.

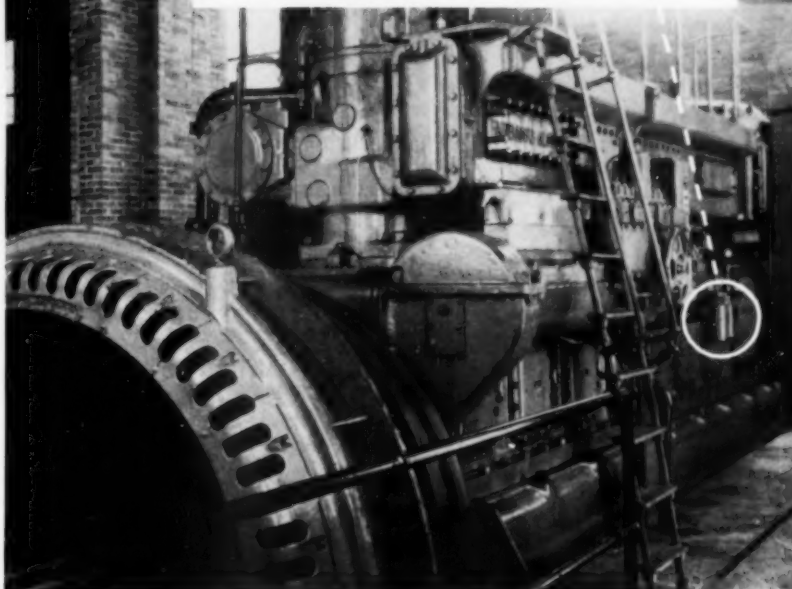
Other case histories, reported in Volume 4, No. 2 of the Honan-Crane quarterly publication, tell of savings in industrial, marine and power installations of Honan-Crane equipment. Kaiser-Frazer reports savings of 100,000 gallons of high-grade motor oil each year in the engine-testing department in Detroit, an annual dollar saving 10 times the cost of the oil purification installation.

Write for a copy of the new issue of "Clean Oil" today. Address Honan-Crane Corporation, 202 Indianapolis, Lebanon, Indiana.

FEBRUARY 1949

## Nugent Filters

on the Fairbanks-Morse  
1400 H.P. Model 33F16 Diesel  
at Paris, Kentucky



### Nugent Duplex Filter has large capacity, provides continuous filtering action

The Fairbanks-Morse power installation, above, consisting of a new 1400 H.P. Model 33F16 diesel and a 980 K.W. Fairbanks-Morse generator, is equipped with a Nugent Duplex fuel oil filter. The compact duplex unit, shown at the right, efficiently removes foreign particles from the fuel oil and provides continuous filtering action with instant switching between filter sections. It has 20 times the filtering area of other comparable-size filters, and will operate for longer periods without cleaning.

Ask a Nugent engineer to give you full details on our complete line of lube and fuel oil filters and lubricating specialties.



Established  
1897

**Wm. W. Nugent & Co., Inc.**  
415 N. Hermitage Ave. CHICAGO 22, ILLINOIS

OIL FILTERS, OILING AND FILTERING SYSTEMS, TELESCOPIC OILERS,  
OILING DEVICES, SIGHT FEED VALVES, FLOW INDICATORS  
Representatives in Boston • Cincinnati • Detroit • Houston • La Junta, Colo. • San Antonio  
Minneapolis • New Orleans • New York • Philadelphia • Portland, Ore. • San Francisco  
Seattle • St. Louis • Tulsa • Representatives in Canada: Montreal • Toronto • Vancouver

**HERE ARE THE EXTRAS**  
you get when you buy an engine from  
**STEWART & STEVENSON SERVICES**

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- Service Certificates**
- Centralized Responsibility**
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- Factory-Trained Engine Experts**
- Flat Rate Zone Trip Charges**



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**GUARANTEED PERFORMANCE IS YOUR**  
**ASSURANCE OF SERVICE SATISFACTION**



You don't take chances when you buy an engine from Stewart & Stevenson. We sell engines on the basis of doing a certain job—not just delivering a certain horsepower. If the engine fails to perform as specified—and we can't make it do so—it is removed at our expense and your money gladly refunded.

Stewart & Stevenson engineers recommend the engine best suited for each particular job. Our factory is available for the design and

fabrication of all substructure, drives and auxiliaries. Furthermore, Stewart & Stevenson engineers and factory trained servicemen stay on the job sufficient time to make sure every installation is complete and the engines operating at top efficiency.

Guaranteed performance is just *one* of the many extras you get when you deal with Stewart & Stevenson. For full information contact your local Stewart & Stevenson representative.

## **STEWART & STEVENSON SERVICES, Inc.**

<b>HOUSTON</b> 4516 Harrisburg Blvd. 4801 Lammont Ave. Phone W. 6-9691	<b>DALLAS</b> 643 R. Port Ave. Phone L. 6-6640	<b>CORPUS CHRISTI</b> 643 R. Port Ave. Phone 6252	<b>MALLEN</b> 19 East Highway Phone 1760	<b>WICHITA FALLS</b> P. O. Box 1413 Phone 2-3519	<b>GREGGTON</b> P. O. Box 546 Phone 2007	<b>LUBBOCK</b> 1624 4th Ave. Phone 2-7538
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### **DEALERS:**

Sabine Propeller & Marine Service, Port Arthur, Texas  
Bath Truck & Implement Company, San Antonio, Texas  
Phillips-Torgerson Company, San Antonio, Texas  
Standard Engine Company, Longview, Texas

### **BEAUMONT**

Phone 2-9619

### **SALES REPRESENTATIVES**

#### **LONGVIEW**

Phone 2592-R

#### **LIVINGSTON**

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#### **LAREDO**

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**FABRICATORS OF:** Electric Power Units • Electrical Control Equipment • Truck Bodies Portable Pumping Units, Etc.

**PARTS • SERVICE**  
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**THE NATION'S LARGEST DISTRIBUTORS OF GM DIESEL ENGINES**

# A Million Yards a month



When you  
**SPECIFY CUMMINS**  
you get:

- Fast work cycles
- Fuel savings
- Low maintenance
- Minimum down-time
- Long engine life
- Warranty—100,000 miles or one year
- 'Round-the-clock service



A million yards a month for six months—  
that's the earth-moving record of

C. J. Langenfelter and Son, Inc., on the Baltimore, Md., Friendship International Airport job. And 23 Cummins Diesels helped set this record.

For example, 11 Cummins-Powered Super C Tournapulls made seven round trips an hour on a 17/8-mile haul, carried 15-yard loads at top speed on soft sand. Cummins Power also proved itself on this job in Wooldridge Terra-Cobras, Euclid Bottom Dumps, Mack tractors, a Lima shovel, and a Euclid loader.

Write for more information about the proved performance and economy of Cummins Diesels.

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA

## National Bearing Appoints James J. Nelson

**JAMES J. NELSON**, formerly Sales Representative, has been appointed Eastern Sales Manager of the National Bearing Division of the American Brake Shoe Company, according to an announcement by T. W. Pettus, Division President.

Prior to first joining the Brake Shoe Company, Mr. Nelson served as a Divisional Vice-President of the Baldwin Locomotive Works. A native of Brooklyn, New York, he is a member of the United States Naval Engineers, and the Society of Naval Architects & Marine Engineers. Eastern

Sales Headquarters of National Bearing Division is in Meadville, Pennsylvania.

## New York Central Orders More Diesels

**THE** New York Central and two affiliated railroads recently announced orders totaling slightly more than \$18,000,000 for new diesel-electric locomotives, the bulk of them for freight service.

The purchases cover seven 2,000-hp. road freight units; thirty 1,500-hp. road freight units; two 2,000-hp. transfer locomotives; fourteen 1,500-hp. road switching locomotives; five 1,000-hp. road

switching locomotives; sixty-one 1,000-hp. switching locomotives, and four 2,000-hp. passenger locomotives.

The locomotives will be constructed by the Electro-Motive Division of General Motors Corp.; American Locomotive Co.; Fairbanks, Morse & Co., and Lima-Hamilton Corp. Deliveries are scheduled for late in 1949 and in the first half of 1950. The new diesel-electrics total 158,000 hp. and will bring the Central System's total diesel-electric locomotive horsepower to 948,600.

## New Side Inlet Exhaust Snubber

**DEVELOPMENT** of a new line of Side Inlet Exhaust Snubbers with "Fog-jet" has been announced by the Burgess-Manning Company, Libertyville, Illinois. They are used on all 2 and 4-stroke cycle stationary gas engines (operating on either the Diesel or Otto cycle) requiring control of exhaust explosions during starting, as well as continuous suppression of sparks. Designated as Series SDL, these units are available in pipe

sizes from 5 to 30 inches, inclusive. The SDL Series Snubber incorporates a Fog-jet which sprays a cooling water mist into the exhaust gases. Flame from the engine is also cooled and extinguished, while gas in the Snubber is made noninflammable by the mist.

Exhaust slugs entering the Snubber spin off a deflecting plate. The spinning action scrubs and breaks up carbon and other foreign material. The gas then spins into the second scrubbing section. Before the exhaust gas emerges, glowing sparks have been "scrubbed out," and the two snubbing sections, connected by a compact coaxial tube arrangement, snub the slug of exhaust gas to prevent noise.

## Deep in the Heart of Bongo Land



**ON** their recent trip to the "Mountains of the Moon," in the heart of Africa, the Gatti Halli-crafter expedition paused to let fierce Masai natives view some of man's wonders. Here native curiosity is literally "shown the light" of a press bulb hooked up to a Globe "Spinning Power" battery—one of many Globe batteries used to furnish electrical power for radio equipment, trucks and electricity on the expedition.



## A THIRTY-FOOT 28,000 POUND CRANKSHAFT BEING MACHINED

Our complete diesel repair facilities, developed over the last forty years, enable us to repair shafts of any size, regardless of the nature or location of the damage. Fractured sections are cut out, new forged sections are shrunk in place, then refinished in perfect alignment without reducing journal or crankpin diameters.

Our service includes experienced personnel available for "on location" inspection or work, or to recommend action. Our experience includes the ability and the equipment to handle any type of diesel repair or rebuilding.

**IMMEDIATE ATTENTION**  
given to trouble calls  
anywhere in the United  
States. Phone L.D. 84,  
wire or airmail.

"KEEPING PACE WITH DIESEL PROGRESS"

# WASHINGTON IRON WORKS, Inc.

Established 1876

## SHERMAN, TEXAS

## KIENE MODEL K-120 UNIVERSAL PEAK PRESSURE INDICATOR

For

Testing Firing and  
Compression Pres-  
sures on all Models  
of Diesel and Gas  
Engines



Model K-120 with cooler body and nozzle dummy.

MODEL K-120 Indicator has but one moving part—nothing to wear or get out of adjustment.

VALVE—Gas trap type with diaphragm type check valve having adjustable lift. Stainless steel valve and seat.

No springs—No pistons—No complicated adjustments—No temperature corrections—no pressure loss in check valve.

GAGE READS TRUE PRESSURE—MAY BE RECALIBRATED ON ANY GAGE TESTER

Check readings can be made over and over again by rotating indicated pressure with bleed-off valve.

GAGE—Hydraulic 3/4 inch dead weight tested in suitable range to specification requirements.

ADAPTORS available for most models of engines manufactured in U.S.A. Other models made to order at reasonable prices.

Dependable — Easy  
to Use — Rugged.  
May Be Used With  
or Without Flexible  
Tube

DESCRIPTIVE BULLETIN  
AND PRICES FURNISHED  
ON REQUEST

Manufactured under patents  
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others pending

**KIENE DIESEL ACCESSORIES, INC.**

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*The UNION DIESEL ENGINE Co.*

2200 EAST SEVENTH STREET  
OAKLAND 8, CALIFORNIA, U. S. A.

## DIESEL USERS!

Here's how FRAM FILTERS  
can save you money . . .

Read these excerpts from the letter of a Fram user

BARTON MINES CORPORATION  
NORTH CREEK, N. Y.  
WARREN COUNTY

July 6, 1948

Fram Corporation  
Providence 16, R. I.

"We have installed Fram Filter units on three of our Diesel engines... running in an exceedingly dusty location. We have cut lubricating oil consumption over one-half... greatly increased time between overhaul periods... the liner, ring and bearing wear is a great deal less... We are now erecting a new power plant... installing Fram Filters on this unit. Our detergent type oil is still clear after maximum use... we have minimized hard carbon formation... We honestly recommend these Filters... paid for themselves in less than 6 months."

Yours very truly,  
BARTON MINES CORPORATION  
J. H. Vogel, Vice Pres.

### FRAM Can Help You!

No matter what your Diesel oil filtering problem—fuel or lube—Fram can help you conquer it. Let Fram's Research Department help you by determining what Fram Filcron Oil Filter you need for keeping injectors clean and efficient... keeping vital moving parts free from the damage caused by dirt, dust, grit, sludge and abrasives.

Save money, time on overhauls, breakdowns, the Fram Filcron way. Write today to Fram Corporation, Providence 16, R. I. In Canada: J. C. Adams Co., Ltd., Toronto, Ontario.

**FRAM**  
*Filcron*

THE MODERN OIL FILTER



(Advertisement)

## SUPERMARKET OPERATION FOR DIESEL FIELD

ASK the Mrs. about a supermarket and she'll tell you that it's the one place in town where she can get the widest selection of food and groceries at the lowest prices. Just as there are supermarkets for food and groceries, there's a "Supermarket for Power."

The same basic principles of supermarket operations are applied to the power field by BFM. Instead of food and groceries BFM stocks a complete selection of power equipment. Mainly con-

centrating on the diesel end, the brand names carried read like a blue book of the power field. Cooper-Bessemer, Caterpillar, International Harvester, Witte, Fairbanks-Morse are just a few of the famous names represented. But the variety is only one phase of supermarket operation, the more important factor, especially today, is the low prices made possible through supermarket operations.

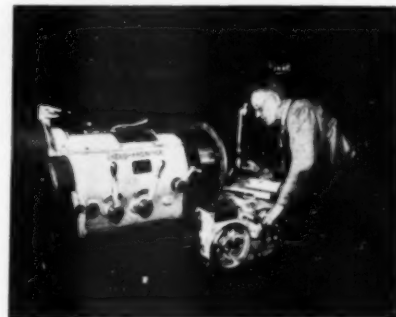
Some of the equipment stocked at BFM is gov-

(Advertisement)

(Advertisement)

ernment surplus, but with the wealth of surplus equipment rapidly dwindling away, the shelves are being restocked with factory new equipment with the same low price policy prevailing.

Other important facilities which contribute to the "Supermarket for Power" operations are BFM's engine and machine shops.



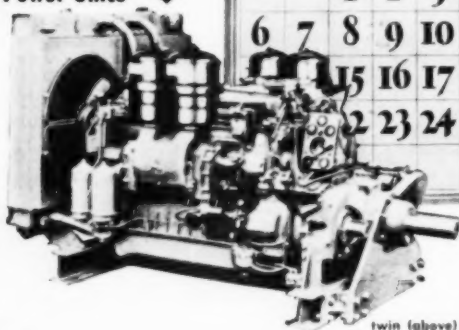
Turning adapter on 20 inch lathe in BFM Machine Shop.

### POWER UNIT OF THE MONTH

#### BFM Diesel Industrial Power Units

use them in . . .

ice plants  
irrigation projects  
saw mills  
logging camps  
mines  
oil well drilling  
quarries . . . . .



twin (above) max. 330 h.p.  
single engine max. 165 h.p.

For any application requiring from 120 to 330 heavy-duty horse power . . . these units **cannot be beat, in price or performance.** Packaged as complete sets with power take-off and radiator cooling, BFM diesel industrial power units are available with either single or twin GM 6 cylinder, series "71" diesels . . . new (gov't. surplus) or rebuilt-guaranteed — equal to new, at a lower price.

Check with BFM today for more complete information on these rugged, low priced units . . . and don't forget, **whatever** your problem as long as it spells P-O-W-E-R, call on BFM.

(Est. 1904)

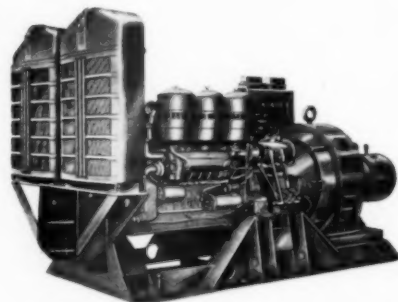


A SUPERMARKET FOR POWER

#### BENJAMIN'S FOR MOTORS

2090 Mill Avenue, Brooklyn 15, N. Y.

Completely equipped, the shops are constantly busy assembling diesel generator sets and power units, also constructing special units to customers specifications. One of the outstanding units recently completed was a 150 kw. automatic starting diesel generating set ordered by the Port of New York Authority for New York's new International Airport. The set was built from twin General Motors 6-71 diesels and a Westinghouse alternator. Automatic starting equipment for the unit was designed by BFM's electrical engineering division.



150 kilowatt automatic starting diesel generating set.

In order to get an idea as to the activity at the "Supermarket of Power," look at the record; during 1947-48 BFM processed over 200,000,000 watts of electric power and in excess of a quarter million horsepower in prime movers.

#### Diesel Engine Specifications Booklet

Recently issued by BFM and available at no cost to interested parties is a 32 page booklet containing complete specifications covering every commercially manufactured American diesel engine. Listing model numbers and all other important information this booklet should prove extremely valuable to industrial purchasing men and diesel technicians. Write to Benjamin's for Motors, 2090 Mill Ave., Brooklyn, N. Y. for your copy.

# WHETHER YOU BUILD OR OPERATE DIESELS

...IT WILL PAY YOU TO INSIST ON



SEALED POWER  
SLEEVES



SEALED POWER  
RINGS



SEALED POWER  
PISTONS

**FOR ORIGINAL EQUIPMENT**—Leading Diesel engine builders in truck, tractor, and equipment fields have long preferred Sealed Power Products.

**FOR REPLACEMENT**—Leading distributors throughout America are stocked with Sealed Power motor parts to meet Diesel engine needs.

**SEALED POWER LEADS THE FIELD**—Whether you build or operate Diesels, Sealed Power offers you the full resources of the industry's finest technical staff, laboratories, and manufacturing facilities.

## Sealed Power

PISTON RINGS · PISTONS  
CYLINDER SLEEVES



SEALING POWER  
CORPORATION  
ANN ARBOR, MICHIGAN  
IN CANADA: CHRYSLER DIVISION

### O. B. Whitaker Observes 35th Anniversary With Sperry Gyroscope

O. B. WHITAKER, manager of marine sales for Sperry Gyroscope, recently observed his thirty-fifth anniversary with that company. Prominent



O. B. Whitaker

He contributed to aircraft instrument development, was chief inspector and managed field service and advertising and publicity before becoming manager of marine sales in 1929. During the recent war he served as manager of federal and marine sales. Mr. Whitaker was recently elected treasurer of the Society of Naval Architects and Marine Engineers. He is a past president of the Propeller Club of the United States, Port of New York, and member of the American Society of Naval Engineers and Board of Visitors of the New York State Maritime Academy.

in marine circles, Mr. Whitaker joined Sperry in 1913 following service in the U. S. Navy. He was active in gyro-compass work here and abroad prior and during World War I, and established the widely-known Gyro-Compass School in Brooklyn.

### Insulation Testers Described in New Sticht Bulletin

THE Herman H. Sticht Co., Inc., has just issued a new bulletin No. 1248 which shows in condensed form all Megohmer Insulation and Resistance Testers sold by the Sticht Company.

The Sticht line of Megohmer Insulation Testers consists of both the DC generator (hand crank

type) and the non-cranking, battery-vibrator type and in this way is the most comprehensive line of accurate and reliable Megohmmeters on the market. There is a Megohmer listed for every purpose. Also, the back page of this leaflet shows the advisability of using megographs to keep track of condition of motors, generators, etc. Write Herman H. Sticht Co., Inc., 27 Park Place, New York 7, N. Y., for Bulletin No. 1248.

### Engineering Societies Meetings Scheduled

#### S.A.E. National Meetings

1949

Passenger Car, Body and Production Meeting	Book-Cadillac Hotel	Detroit, Mich	March 8-10
Transportation Meeting	Statler Hotel	Cleveland, O.	March 28-30
Aeronautic and			
Air Transport Meeting	Hotel New Yorker	New York, N. Y.	April 11-13
Summer Meeting	French Lick Springs Hotel	French Lick, Ind.	June 5-10
West Coast Meeting	Mulmoham Hotel	Portland, Ore.	August 17-19
Tractor (possibly diesel)		Milwaukee, Wisc.	September

#### A.S.M.E. National Meetings

Oil and Gas Power Division	Hotel Sherman	Chicago, Ill.	April 25-29
Spring Meeting		New London, Conn.	May 24
Semi-Annual		San Francisco, Cal.	June 27-30
Fall Meeting		Erie, Pa.	Sept. 28-30
Annual Meeting	Hotel Pennsylvania	New York, N. Y.	Nov. 27-Dec. 2

## THE MODERN LUBE OIL AND JACKET WATER COOLER—GRAHAM MONOBOLT



A compact and highly efficient cooler recommended for all engine services.

Graham Monobolt coolers may be disassembled for cleaning or inspection in a matter of minutes; they

incorporate many other improvements in construction details that result in a top-notch cooler.

Deliveries are good and prices are competitive.

Ask for leaflet MP-119 for full details.

**GRAHAM MANUFACTURING CO., INC.** 415 Lexington Ave., New York 17, N.Y.



**"FIXED-READING"**  
**PREMAX**  
 MODEL YRF  
 ENGINE PRESSURE INDICATOR

for **DIRECT-READING**  
 of **COMPRESSION** and  
**FIRING PRESSURES**  
 OF EVERY TYPE OF DIESEL ENGINE

ONE OF THE FEATURES  
 Responsible for its Overwhelming  
 Preference by Leading Diesel  
 Manufacturers and Operators

Spring-balance principle assures lastingly dependable service. No field adjustments or settings are required to take care of gauge drifting, or to compensate for other instrument characteristics and engine conditions.

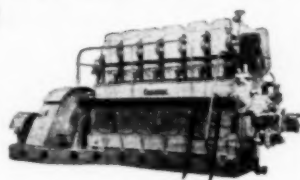
For other features, write for  
 Bulletin 294

**BACHARACH**  
 INDUSTRIAL INSTRUMENT CO.  
 1000 BROADWAY STREET • PITTSBURGH 6, PA.

**ACCURATE  
 PRESSURE  
 READINGS  
 as high as  
 1700 P.S.I.**

## NEW ENTERPRISE DIESELS MODEL DSG-6

FOR  
 IMMEDIATE  
 DELIVERY



WITH  
 375 KVA, 300 KW IDEAL ELECTRIC CO.  
 A.C. GENERATORS, 450 RPM

These units are offered at considerably less than the manufacturer's list prices. Write or wire today for complete information about these slow-speed fully-guaranteed Diesel units for your electric power requirements.

**DIESEL PLANTS FROM 10 TO 1420 KVA  
 WHAT ARE YOUR REQUIREMENTS?**

**AG SCHOONMAKER CO INC.**  
 54 CHURCH STREET NEW YORK 7, NEW YORK



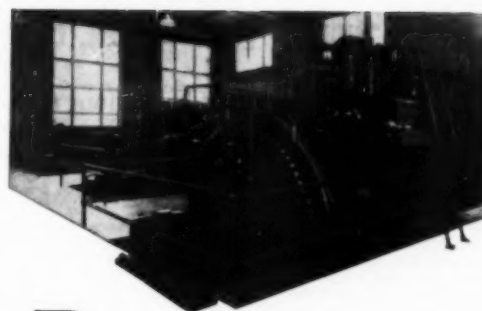
## 40,000 Hours of Trouble-Free Operation with D-A Lubricants

Nothing but D-A Lubricants and Engine Oils are used in the diesel-powered equipment of Radio Station WHIT, Marion, N. C., the subject of a feature story elsewhere in this issue of DIESEL PROGRESS.

As a result, three generating sets have operated more than 7,000 hours each with minimum maintenance where parts are affected by lubrication . . . and a fourth set has operated 20,684 hours without overhaul.

Operating records are the best proof that D-A Lubricants and Engine Oils make equipment last longer and perform better. D-A products are made by the oldest and largest company specializing exclusively in lubricants for heavy-duty equipment . . . they are sold by equipment dealers everywhere.

**D-A LUBRICANT COMPANY, INC.**  
 INDIANAPOLIS 23, INDIANA



## Paris POWER PLANT gets DEPENDABLE OIL PURIFICATION

Honan-Crane delivers dependable oil purification at the Municipal Power Plant, Paris, Kentucky, where four Fairbanks-Morse diesels meet the peak load of 2080 kw.

Superintendent Edgar Dodge reports power cost of \$.0086 per kwh, delivered for continuous 14 year period without any interruption from engine failure. In this time, the diesels ran 141,955 hours.

For full information on low cost purification of diesel fuel and lube oils, write to 202 Indianapolis Avenue, Lebanon, Indiana.

**HONAN-CRANE CORP.**  
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The Products of 53 Engine Manufacturers. Each engine description is complete and accurate—checked and double-checked by the Manufacturer himself. Illustrations include full page engine views, lube and fuel system diagrams, also cooling systems—many traced in color. But that is just the Diesel engine section. The Catalog also includes an accessory section carrying valuable information on the various Fuel Injection Systems, Gear and Chain Drives, Turbochargers, Blowers, all fully described and profusely illustrated.

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There is a Market Place Section—a directory of Diesel engines classified as to ratings and speeds with manufacturers' names and addresses—and a Product Directory including accessories, parts, materials and services—all classified as to products. The Market Place tells you at a glance where to find what you want for your engine or plant.

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Enter my order today for a copy of the 1948 Diesel Engine Catalog, Volume Thirteen, Edited by Rex W. Wadman, for which I enclose \$10.00, also payable at £2 10s. 0d. to E. H. Doddrell, 342 St. Paul's Corner, Ludgate Hill, London E.C.4.

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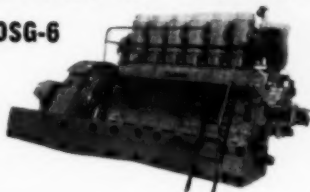
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FEBRUARY

## NEW ENTERPRISE DIESELS

### MODEL DSG-6

\*2—300 KW AC  
\*2—250 KW DC  
450 HP at 450 RPM



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HP	Model	KVA	RPM
2—1600	General Motors 16-278A	1250	720 3/60/2300
2—1600	General Motors 16-278A	1250	720 3/60/2400-4160
1—450	Fairbanks Morse 32-E-14	375	300 3/60/240
1—300	Fairbanks Morse 32-E-14	250	300 3/60/240
1—360	Fairbanks Morse YVA	300	257 3/60/2400
1—300	Buckeye E	250	400 3/60/240-480
1—240	Fairbanks Morse YVA	200	257 3/60/2400
*2—240	Buckeye 80	187.5	600 3/60/240-480
*3—	90 General Motors 6016-E	75	1200 3/60/127-220
		62.5	1000 3/50/230-400
		37.5	1200 3/60/127-220
*2—	45 Int. UD-14	31.2	1000 3/50/230-400
1—	79 Caterpillar D4600	37.5	1200 3/60/220-440
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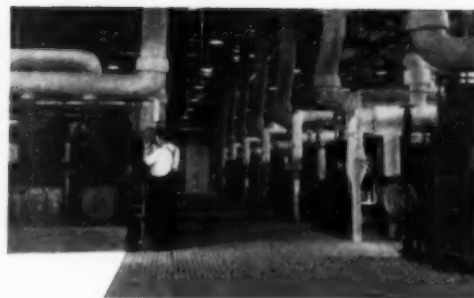


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Honan-Crane oil purifiers are installed on twenty-five 300 hp Worthingtons and Ingersoll-Rands, and eighteen 800 hp Ingersoll-Rands by Polymer Corporation, Samia, Ontario, Canada.

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1600 H.P. at 750 RPM  
1440 H.P. at 720 RPM

### Complete with

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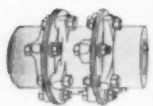
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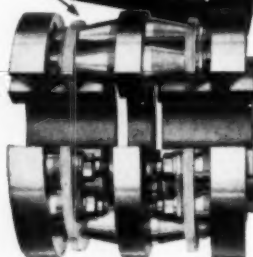


The standard line of Thomas Couplings meets practically all requirements. But if unusual conditions exist we are equipped to engineer and build special couplings.



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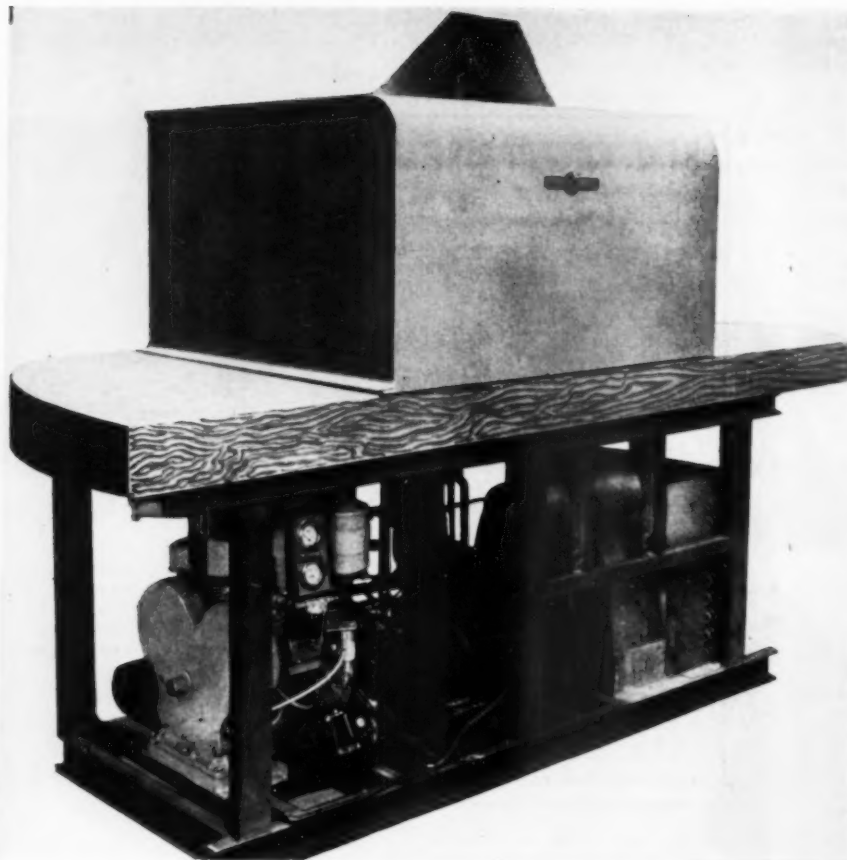
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**THOMAS FLEXIBLE COUPLING CO.**  
WARREN, PENNSYLVANIA



Truck refrigeration power package with Sheppard 5.4 hp. diesel.

## Small Diesels For Truck Refrigeration

**T**HE rapidly increasing demand for refrigerated trucks and truck trailers has opened a new field for the small diesel engine. Producers and shippers of perishable foods have for some time used small gasoline engines to drive refrigerating compressors in their highway equipment but now the advantages of small lightweight diesels have been demonstrated and the future is all theirs.

One of the manufacturers of truck refrigerating equipment, Trail Aire Corporation is now using diesel equipment. That company has utilized a Sheppard one cylinder, 5.4 hp. diesel to drive its refrigerating unit. The diesel replaces a 4 cyl., 17 hp. gasoline engine.

Comparative performances indicate that the diesel unit has nothing to fear from a fuel economy standpoint. Both diesel and gasoline-powered units are installed in frozen food trucks hauling from Atlanta, Georgia, to Boston, Massachusetts.

On recent trips the units driven by gasoline en-

gines consumed 70 gallons of 27-cent fuel, while the diesels used 15 gallons of domestic furnace oil No. 2 costing 13 cents per gallon. Both types of engine operated 45 hours. The fuel cost for the diesel was \$1.95; for the gas engine \$18.90.

This same ratio of expenses more or less holds true for diesel and gasoline engined trucks and it does not take much figuring to estimate the reduction in costs for an all diesel operation.

Sheppard has recently made several diesel truck installations in Corbett equipment which have proved very successful. With this diesel combination the company is equipped to engine both trucks and their refrigerating units. The railroads had better look to their rates for refrigerated produce when these all-diesel refrigerated trucks begin swinging up the Atlantic Seaboard heading for the northern markets with trailer loads of perishable commodities. The competition is rough already. It will be rougher when the diesels really get rolling.

### Reynolds Appointed Vice President of Continental Equipment Corp.

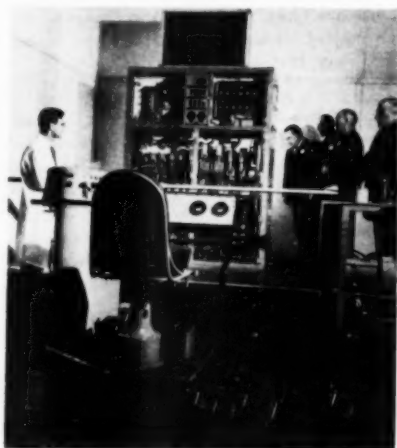
**FRANK H. REYNOLDS**, veteran railroad equipment executive, has been named vice president of the Continental Equipment Corporation, according to an announcement made by Harold C. Lenfest, president. His headquarters will be at 30 Church Street, New York City.



F. H. Reynolds

In his new association, Mr. Reynolds will develop expanding activities in the railroad department of Continental Equipment and will also be concerned with increased activities in the marine and diesel field.

### Aleo Diesel Locomotive School



**I**N stride with the increased activity at the American Locomotive Company here is the diesel-electric locomotive school for railroadmen, which is booked for months in advance. The practical value of the schooling is shown here as four railroadmen inspect an electrical panel board, which is operated from the control stand beside the engineer's seat in center foreground. The equipment is the same as that in an actual locomotive. During the course in the construction, operation and maintenance of diesel-electric locomotives, the men actually build a diesel engine.

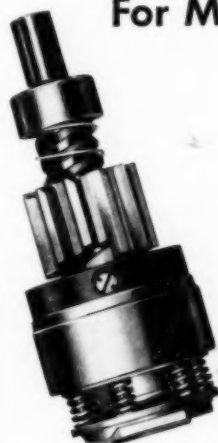
### More Mack Buses For New York

**A. C. FETZER**, Vice President of Mack-International Motor Truck Corporation, announces the sale of 25 new Mack 45-passenger buses to the Third Avenue Transit Corporation to provide additional service in the Borough of the Bronx. These new 45-passenger diesel buses are the same type recently put in service on the 56 routes of the Third Avenue Transit System in Manhattan and the Bronx. This brings the total of Mack buses put in service by the Transit System in the past year to 210.

## Whatever Your Type of Diesel...



### Specify *Bendix* Starter Drive For More Economical Installations!



There are several definite factors responsible for Bendix\* Starter Drive economy: Its simple design lets you mount the starting motor more easily and in more positions. It requires no actuating linkage—has fewer parts—needs fewer adjustments. The solenoid may be mounted in any convenient position. No other starter drive made can match these economy advantages! So whatever your type of Diesel, specify Bendix Starter Drive for economy and all-around performance.

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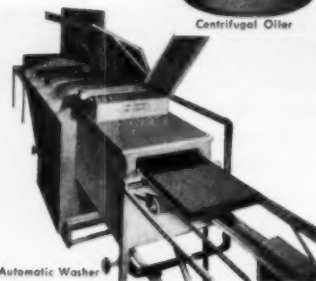
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Here is completely automatic equipment which will cut filter maintenance costs and do a better service job for you. The Far-Air units presently in operation for some of the major lines have proved our performance claims—filter cleaning and oiling costs reduced up to 67% when as few as 100 filters are serviced per day.

Designed to handle filters of all sizes, this filter-a-minute equipment thoroughly cleans and recoils filter units and permits immediate use of the filters after servicing. It adds considerably to the service life by eliminating rough handling and corrosion.

Complete information—drawings, specifications, photographs, installation, operation and maintenance instructions, comparative cost data—are available for your inspection. Investigate this equipment now.

Among the users of this Far-Air equipment are:

Atchison, Topeka and Santa Fe Railway Co.  
Union Pacific Railroad  
New York Central System  
The Pennsylvania Railroad  
Chicago, Northwestern Railway Co.



## A Statement by Robert McColl President, American Locomotive Company

WITH all locomotive production converted to the manufacture of diesel-electric locomotives, the American Locomotive Company is prepared to build many more diesel-electric locomotive units in 1949 than at any time in its history. Also 1949 will mark the first year in more than a century that no steam locomotives will be built at the Schenectady plant. Some steam facilities are in stand-by status to provide for any unforeseen demand for this type of motive power.

This is not a postwar boom. The American railroads are undergoing a railroad power revolution. They have embarked on a long-term program to replace the 35,000 steam locomotives on the lines in the United States with modern diesel-electric power. They are doing this because diesel-electric power saves them money—and for that reason alone. We estimate that it will take 20,000 diesel-electric locomotives to do this job.

Those railroads that turned to diesel-electrification several years ago are already realizing vast economies in operation expenditures. Several have indicated that the use of diesels has been the difference between paying dividends and not. Many Class 1 railroads are well on the way to complete dieselization and others are unmistakably heading in that direction. In most cases the diesel-electric locomotive is actually paying for itself in a three to four-year period.

Our own prospects at American Locomotive Company for 1949 seem very strong in view of the railroad demand for this new motive power. Then, too, as more and more diesel-electrics are delivered, the replacement parts business grows in scope. We have been preparing for this new phase of our business for many years. A chain of warehouses has been established in strategic parts of the country to provide a rapid and even flow of these parts as required by customer railroads. In addition, our oil refinery equipment and railway steel spring businesses are planning for the best years in their history.

## Air Maze Elects New President

OLIVER H. SCHAAF, formerly vice president and general manager of the Air-Maze Corporation, has been elected president and will continue as general manager, according to a recent announcement by the Company. A. E. Schaaf, president for nearly 25 years, has been elevated to Chairman of the Board of Directors.

Main offices and factory of Air-Maze are located at 5200 Harvard Avenue, Cleveland, Ohio. The firm manufactures air filters, oil filters, silencers, spark arresters, oil separators, and other accessories for the engine, compressor and ventilating industries.

**Order Your Copy of the 1948  
DIESEL ENGINE CATALOG, Vol. 13  
now. Thoroughly revised — more  
complete — indispensable. Con-  
venient order coupon on page 72  
this issue. Mail it today.**

## Sealed Power Announces Promotions

THE appointment of Raymond A. Snyder to the position of Sales Manager of the Original Equipment Piston Ring Division of Sealed



Raymond Snyder

Power Corporation, Muskegon, Michigan, has been announced by Paul C. Johnson, Executive Vice-President. Snyder, who has been with Sealed Power for twenty-four years, was formerly assistant chief engineer. Prior to entering the Engineering Department, he spent several years on manufacturing and production problems.

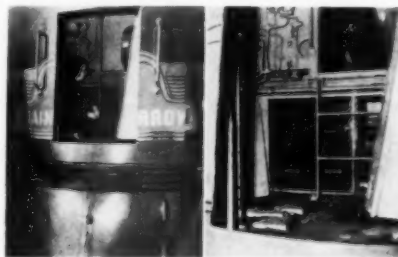
Don Paull, a member of Sealed Power's engineering staff, has been promoted to the position of Assistant Chief Engineer. A graduate of the University of Michigan, he has been with Sealed Power since 1942.

Several changes have also been made on the sales engineering staff of the Original Equipment Division. Ed Carlson, a graduate of the University of Michigan and a member of the Sealed Power engineering staff since 1940, has been assigned as Sales Engineer to the Detroit office. In more recent years he has been Dynamometer Test Engineer and Product Engineer for Sealed Power.

Robert Hawkins, who has been with Sealed Power since 1940 and a Sales Engineer in the Detroit office since 1945, has been assigned Sales Engineer for Industrial Sales and he will now work out of the Muskegon office. Graduate of Brown University.

Stuart Nixon, who has been covering the industrial field, is being assigned to special work in the Engineering Department and development and research of piston rings, pistons and cylinder sleeves for the industrial field. Nixon is a graduate of M.I.T. and has been with Sealed Power since 1933.

## In the Forefront of Railroading



Mrs. Joan Hopewell of Trenton, N. J., framed in the very prow of the General Motors Train of Tomorrow, eyes the 3,300 pounds of Gould Kathanode batteries which supply starting power for the big diesels. She was one of the many Gould Battery Corp. employees who visited the famous train when it went on inspection for three days in mid-November outside the battery plant in Trenton.

## How to CLEAN LUBE OIL COOLERS —no dismantling!

**T**O remove gummy oil deposits and heavy sludge accumulations from the tubes of your lube oil coolers, circulate a solution of a specialized Oakite cleaner through the deposits; rinse and drain. No dismantling or tube-pulling required. You'll find that normal heat transfer efficiency is effectively restored.

Full details about this and 70 other Diesel cleaning, descaling and paint-stripping jobs in NEW manual "Oakite Power Plant Cleaning"—yours FREE. Write.

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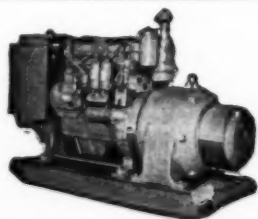
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**NEW • REBUILT • RENTALS**

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D.C. A.C., 25-50-60 Cycle

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## NEW DIESEL GENERATOR UNITS

DC and AC; 50 and 60 cycles

Also compressor and pump units and combinations designed and built to order  
Also Marine Engines

EARLY DELIVERY

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## Dr. Buchi Announces Appointment of E. G. Huber

**DR.** ALFRED J. BUCHI, whose system of turbo-charging diesel engines is widely used in this country and abroad, has just recently announced



E. G. Huber

the appointment of Mr. E. G. Huber as his engineering representative for the United States and Canada, with office at 707 Munsey Bldg., Washington 4, D. C.

Mr. Huber will act as a liaison man in this country to facilitate contact and expedite the exchange of the necessary engineering information

and instructions between manufacturers here and Dr. Buchi's office in Switzerland.

## Diesel Exhaust and Fuel Line Bulletin

**T**O THOSE in the power industry who wish to obtain a practical handbook on the proper application of metal tubing for both exhaust and fuel lines, Penflex now offers this in the form of one booklet.

Complete data will also be found in this booklet on the use of flexible metal tubing for lubricating oil lines, water lines, etc., as well as data on the proper couplings to be used. This booklet is available upon request and without obligation. Write direct to Pennsylvania Flexible Metallic Tubing Company, 7200 Powers Lane, Philadelphia 42, Pennsylvania.

## Nordberg Appoints Midwest Manager

**T**HE appointment of Joseph T. Adams as Midwestern District Manager with offices in Kansas City, Missouri, has been announced by R. W.

Bayerlein, Vice-president of Heavy Machinery Division, Nordberg Manufacturing Company.



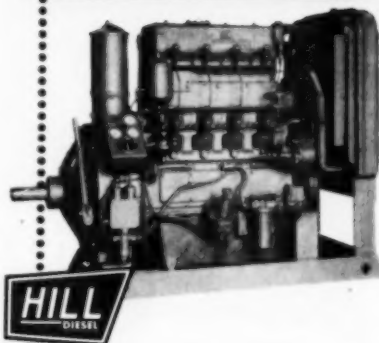
Joseph T. Adams

Prior to World War II Adams was associated with the Busch-Sulzer Bros. Diesel Engine Company in St. Louis, now a division of Nordberg. During the war he served with the Third Army in Europe as an engineer

maintenance and supply officer. Following the war he returned to Busch-Sulzer.

Early in 1947 he was appointed sales-engineer by Nordberg and was transferred to the Dallas Office. Mr. Adams received his engineering education at the Missouri School of Mines and Metallurgy, a division of the University of Missouri, where he received his degree in mechanical engineering.

## R& for Diesel Power HILL "R" SERIES DIESELS



These packages of Diesel power are designed and built by specialists in the small Diesel field . . . pioneers who established the quarter century record of performance that makes Hill the most outstanding small engine presently available.

The "R" series engines, modern and efficient, have been sold, operated, and perfected over the past several years . . . gaining a world-wide reputation for simplicity of construction, stability of operation, and freedom from trouble.

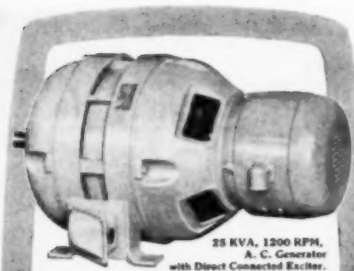
Available in 2, 4, and 6 cylinder models, displacing 106, 212, and 318 cubic inches, respectively, the "R" series delivers from 12 to more than 50 horsepower for continuous service applications. All models are solid injection, full Diesels that start cold directly on Diesel oil.

Power Units, Electric Generating Sets, and Marine Propulsion Engines, as well as Marine Auxiliary Units are available in the "R" series. Standard equipment includes all accessories necessary for operation except starting batteries.

Hill engineers are always at your service . . . ready to study and answer your power application problems. You incur no obligation in requesting information.

*A few territories still are open for qualified distributors.*

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Columbia, with its years of experience, brings to you a wide line of performance proved, sturdily built, A.C. and D.C. Generators. A.C. Generators: 6 1/4 to 375 KVA. D.C. Generators and Exciters: 2 to 200 KW. Available in Single or Two Bearing Construction. Write today for information. Our engineers will be glad to review your requirements. Prompt delivery.

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*Throughout the Power Industry—*  
**Aerofin Fin-Type Heat-Transfer Units do the job Better, Faster, Cheaper.....**

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410 South Geddes St., Syracuse 1, N. Y.

### West Coast Diesel News

By FRED M. BURT

TO BE POWERED with an LML Cummins diesel, 175 hp. @ 800 rpm. through a 2:1 reduction gear, a new 56 ft. all-purpose fish boat is being built by Harold Hansen Boat Co., Seattle, for crab fisherman Roy Fuiford, Westport, Wash.

RE-POWERED with new Buda diesels, the *Annabel*, fishing for Van Camp Sea Food Co. in tropical waters—this time a Buda 844; also the *Southwind*, Kettenburg-built fishing boat, replacing a Buda 230 with a Buda 317; both installations by the Production Equipment Co., Terminal Island.

OPENED in Eureka, Calif., new branch of West Coast Engine & Equipment Co., with Lou Truher as manager. Headquarters in Berkeley, the company handles GM, Detroit Div. marine and industrial diesel engines, Continental Red Seal gas engines, Nordberg marine gas engines, Witte diesels, U. S. Motors light plants, Willard Batteries, wire rope, Bendix depth recorders, and Adel hydraulic controls.

TO SUPPLY power for the potato plant of Bonneville, Ltd., Bonneville Salt Flats, Utah, a model SCC-6, 6-cyl. 450 hp., Worthington diesel driving a 300 kw. generator; also equipped with an Engineering Controls Vapor Phase unit for cooling and waste heat recovery.

AT AVONDALE Marine Ways, New Orleans, a new series of steel tuna clippers, three on order, for San Diego owners, designed by G. Bruce Newby, Long Beach; each to be powered with Model 567 GM 900 hp., 12-cyl. diesels; auxiliaries are pairs of Superior 8-cyl. 120 hp. diesels, direct connected to Electric Machinery 75 kw. generators.

JUST COMPLETED at National Iron Works, San Diego, 155 ft. tuna clipper, largest welded-steel tuna craft ever built in San Diego; to be driven by a 600 hp. Atlas Imperial diesel; 600 man-hours saved by constructing the secondary deckhouse and top pilot house as a single, 20-ton sub-assembly.

THE MARINE Engine Repair Shop, George Carle Mgr., foot of Jones St., Fisherman's Wharf, San Francisco and Bauman Bros. & Miller, Sausalito, Calif. have been appointed as dealers by King-Knight Co., San Francisco, northern California distributors for Buda engines.

THE POWER unit of an integrated tug-barge combination for petroleum transportation (250,000 gal.) is a 100 ft. tug powered with a pair of 1200 hp. supercharged, Cooper-Bessemer diesels completed by the Columbia Barges Lines, Inc., Pasco, Wash.

FOR INSTALLATION in his purse seiner *None-such*, Frank Green, Oak Harbor, Wash. has purchased a 6-cyl. 150 hp. Gray diesel through Jules Engine & Equipment Co., Seattle, northwest Gray distributors.

THE NEW 70 ft. tug *Myrtle*, powered with a 325 hp. Washington diesel, has just been put into

## For Immediate Sale! DIESEL GENERATOR

Busch-Sulzer 4-B-90, 365HP, Air Injection Engine direct connected to GE 250 KW, 225 RPM, 60 Cycle, 2300 volt generator; with necessary air bottles, exhaust and air intake piping, muffler, air filter and large number of spares including piston and liner.

\$7,500 as is on foundation. Unit is in excellent condition and operating daily. May be seen any time.

## ELKO LAMOILLE POWER COMPANY ELKO NEVADA

### DEALER WANTED

Manufacturer of medium- and heavy-duty diesel engines for stationary and marine service will appoint a dealer for New York and New England territory. Only those experienced in diesel engine sales and having machine shop facilities for installation and servicing diesel engines will be considered. If you have these qualifications and wish to negotiate further, write Box 490, DIESEL PROGRESS, 2 West 45th St., New York 19, N. Y.

## Just Out SUPERCHARGING THE INTERNAL COMBUSTION ENGINE

By E. T. Vincent

Professor of Mechanical Engineering  
University of Michigan

323 pages, 6x 9, 167 illustrations, \$5.00

This book contains the essential fundamental theory of the various forms of superchargers and turbo-superchargers, together with a treatment of their effects on engine cycles, power outputs, and thermal efficiencies. The emphasis is on the fundamentals of the thermodynamics and mathematics involved in solving problems of supercharging.

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Please send me a copy of Vincent—SUPERCHARGING THE INTERNAL COMBUSTION ENGINE for 10 days' examination on approval. In 10 days, I will remit \$5.00, plus few cents postage, or return book postpaid.

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• U.E.I. graduates are energetic, ambitious Diesel-thinking men.

Our thorough practical training in operating, maintaining and repairing of Diesel equipment gives these graduates sound fundamentals . . . couple this to their faith in Diesel's future, and you have the kind of men you want to grow with you.

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ton Towboat Co., after construction by Nichols  
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lumbia below Bonneville.

POWERED with twin 320-type Atlas diesels, 114  
ft. *Mount Edgcombe* is operated as a classroom  
by Alaska Native Service, Capt. Benjamin L. See,  
to teach seamanship to Alaska native boys, nine  
weeks aboard, nine weeks ashore; monthly round  
trips made in the Inland passage to Seattle, carry-  
ing 125 tons of freight.

THE 38 FT. combination boat *Poggy*, built by  
Kettenburg Boat Works, San Diego, for Dennis  
E. Lane, has been re-powered by Crofton Diesel  
Engine Co. with a General Motors 60 hp. pro-  
pulsion diesel; 3:1 GM hydraulic reduction gears.  
The engine has a Twin-Disc front-power take-off  
for operation of refrigeration system, pumps, etc.

POWERED with three Union diesels for propul-  
sion and auxiliaries, 128 ft. wooden fantail, tuna  
clipper *Helen Ann* has been commissioned from  
Lynch Shipbuilding Co. yard in San Diego to fish  
for People's Packing Corp.

TO FOLLOW the trend of high power in very  
small boats, two tugs designed by H. C. Hanson,  
Seattle naval architect; the first, a 52 ft. tug for  
Burton Reid, New Westminster, B. C. will be  
powered with a 500 hp. GM diesel; the other a  
56 ft. tug for Pacific Tugboat Co., Everett, Wash.  
will be powered with two 250 hp. Enterprise  
diesels.

THE ASSOCIATED Dredging Co. dredge *Pearl  
Harbor*, has been converted from electric to diesel-  
electric by Sausalito (Calif.) Shipbuilding Co. by  
installation of two 1600 hp. GM Cleveland diesels.  
She will be towed to Mazatlan, Mexico for new  
harbor dredging, by Pacific Towboat & Salvage  
Co.'s (Long Beach) twin screw tug *Kanak*, pow-  
ered with two 350 hp. Fairbanks-Morse diesels.

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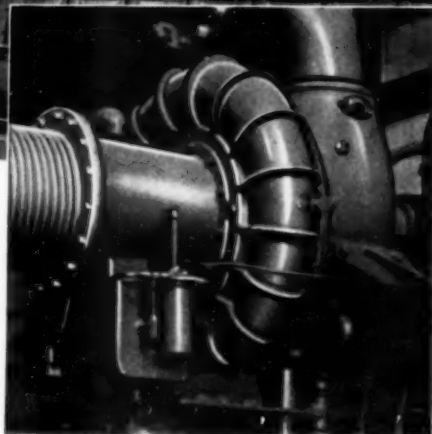
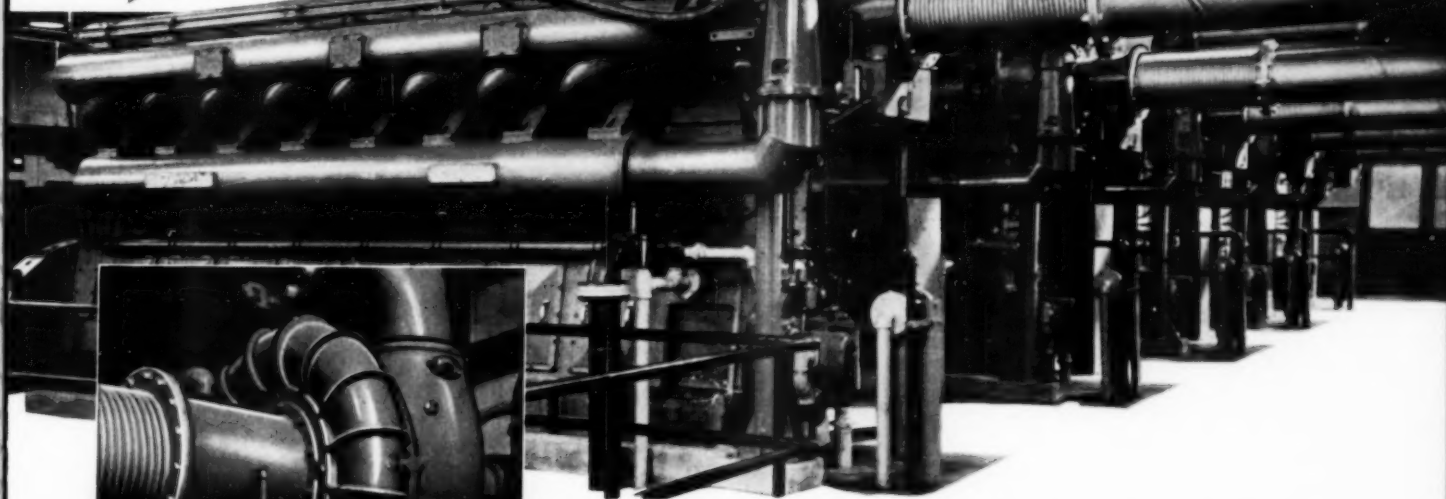
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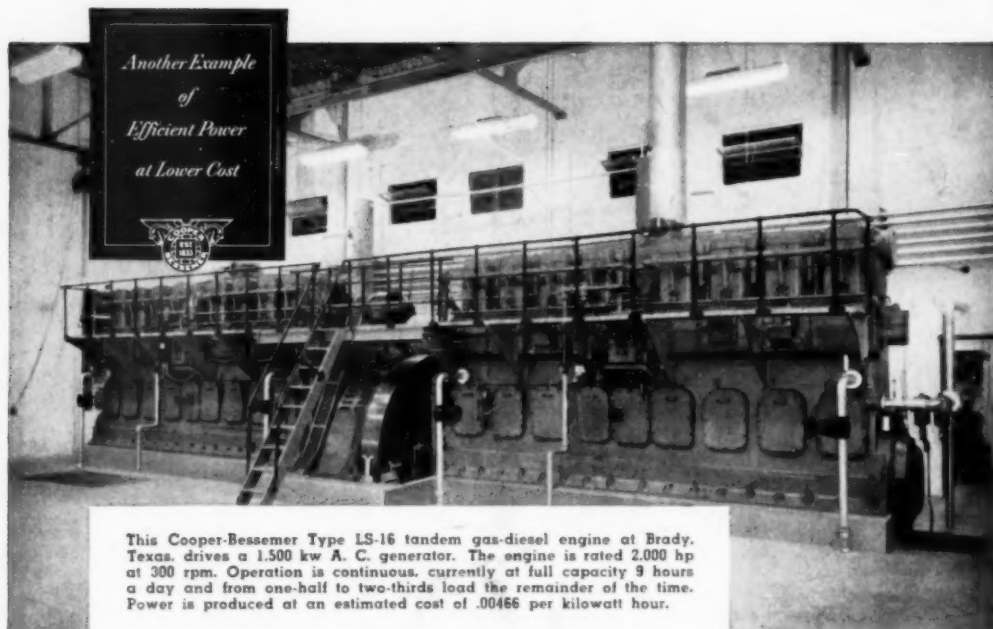
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